Test 1

Total mark 5

1 Choose the correct answer : (3 marks)

1 $\sqrt{(-8)^2}$ = ...

ⓐ -8 ⓑ 8 ⓒ ± 8 ⓓ 16

2 If $3a = \sqrt{4}\,b$, then $\frac{a}{b}$ = ...

ⓐ $3:2$ ⓑ $2:3$ ⓒ $4:3$ ⓓ $3:4$

3 The standard form of the rational number 0.00000072 is .....

ⓐ 7.2×10^{-6} ⓑ 7.2×10^{7} ⓒ 2.7×10^{-7} ⓓ 7.2×10^{-7}

2 If ΔXYZ , if $(XY)^2 = 100$ cm^2 , $(YZ)^2 = 121$ cm^2 , then find $XY + YZ$ (2 marks)

Test 2

Total mark 5

1 Choose the correct answer : (3 marks)

1 $\sqrt{(-8)^2 + (-6)^2}$ = ...

ⓐ $|-10|$ ⓑ ± 10 ⓒ 14 ⓓ -14

2 Which of the following is the greatest ?

ⓐ 2.3×10^4 ⓑ 2.3×10^5 ⓒ 3.2×10^4 ⓓ 3.2×10^5

3 The side length of the square whose area $9x^2$ cm^2 equals ..... cm. where $x > 0$

ⓐ $3x$ ⓑ $3x^2$ ⓒ $9x$ ⓓ $9x^2$

2 Find the result of : $(5.4 \times 10^4) + (3.7 \times 10^5)$ in the standard form. (2 marks)

Test 3

Total mark 5

1 Choose the correct answer : (3 marks)

1 The multiplicative inverse of $\sqrt{\frac{9}{16}}$ is .....

ⓐ $\frac{-4}{3}$ ⓑ $\frac{-3}{4}$ ⓒ $\frac{3}{4}$ ⓓ $\frac{4}{3}$

2 Which of the following numbers is in the standard form ?

ⓐ 11×10^{8} ⓑ 9.7×10^{-5} ⓒ 10.3×10^{-3} ⓓ 0.87×10^{8}

3 If $X = 0.0009$, then $\sqrt{X}$ = ...

ⓐ 0.0003 ⓑ 0.0081 ⓒ 0.003 ⓓ 0.03

2 The area of a square is equal to the area of a triangle with base = 9 cm. long and its height = 8 cm. Find the side length of the square. (2 marks)

Test 4

Total mark 5

1 Choose the correct answer : (3 marks)

1 If $0.00052 = 5.2 \times 10^{m}$, then m = ...

ⓐ 5 ⓑ 4 ⓒ – 4 ⓓ – 5

2 $\sqrt{6\frac{1}{4}}$ = ...

ⓐ $2\frac{1}{2}$ ⓑ $\frac{2}{5}$ ⓒ $\frac{3}{2}$ ⓓ $\frac{2}{3}$

3 The sum of the two square roots of the number 49 is .....

ⓐ 7 ⓑ 14 ⓒ – 14 ⓓ 0

2 [a] Find the result of : 60000×5000 in the standard form. (2 marks)

[b] Simplify to the simplest form : $\left(\frac{-2}{3}\right)^{2} - \sqrt{\frac{16}{81}} + \left(\frac{1}{2}\right)^{\text{zero}}$

Test 5

Total mark 5

1 Choose the correct answer : (3 marks)

1 The standard form of the number 5 millions is .....

ⓐ 5×10^5 ⓑ 5×10^6 ⓒ 5×10^7 ⓓ 5×10^4

2 If $x^{-1} = 4$, then $\sqrt{x} =$ .....

ⓐ $-\frac{1}{2}$ ⓑ $\frac{1}{2}$ ⓒ $\pm\frac{1}{2}$ ⓓ ± 2

3 The additive inverse of the number $\sqrt{\frac{4}{25}}$ is .....

ⓐ $\frac{-2}{5}$ ⓑ $\frac{5}{2}$ ⓒ $\frac{2}{5}$ ⓓ $\frac{-5}{2}$

---

2 [a] Find the result of : $(3.8 \times 10^8) \div (1.8 \times 10^6)$ in standard form. (2 marks)

[b] Simplify to the simplest form : $\left(\frac{-3}{7}\right)^0 \times \left(\frac{-2}{5}\right)^2 \times \sqrt{6\frac{1}{4}}$

Test 1

Total mark 5

1 Choose the correct answer : (3 marks)

1 The parallelogram with two adjacent sides are equal in length is called .....

(a) square. (b) rhombus.

(c) rectangle. (d) trapezium.

2 If the measure of two angles in a triangle are 35° and 55° , then the triangle is .....

(a) obtuse-angled. (b) right-angled.

(c) acute-angled. (d) equilateral.

3 The ray drawn from the midpoint of a side of a triangle parallel to another side ..... the side.

(a) is parallel to (b) is congruent to

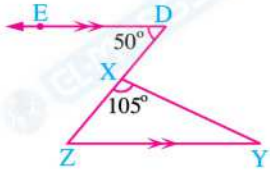
(c) bisects (d) is perpendicular to

2 In the opposite figure : (2 marks)

$\overrightarrow{DE} // \overline{YZ}$, m (∠ ZDE) = 50°

, m (∠ YXZ) = 105°

Find : m (∠ Z) , m (∠ Y) and m (∠ YXD)



Test 2

Total mark 5

1 Choose the correct answer : (3 marks)

1 The parallelogram whose diagonals are perpendicular and not equal in length is called .....

(a) rhombus. (b) square.

(c) rectangle. (d) trapezium.

2 ABC is a triangle in which m (∠ A) = m (∠ B) = 50° , then m (∠ C) = ...

(a) 30° (b) 50°

(c) 80° (d) 100°

3 If ABCD is a square , then m (∠ CAB) = ...°

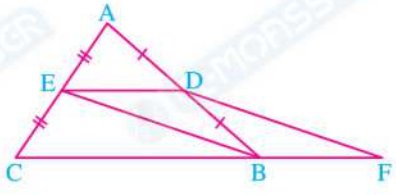
(a) 30° (b) 45°

(c) 60° (d) 90°

2 In the opposite figure : (2 marks)

D and E are the midpoints of $\overline{AB}$ and $\overline{AC}$ respectively , $F \in \overrightarrow{CB}$ where $BF = \frac{1}{2} BC$

Prove that : BEDF is a parallelogram.



Test 3

Total mark 5

1 Choose the correct answer : (3 marks)

1 The sum of measures of the interior angles of a triangle equals the measure of ..... angle.

ⓐ right ⓑ straight

ⓒ acute ⓓ reflex

2 The rectangle whose two diagonals are perpendicular is called .....

ⓐ rhombus. ⓑ trapezium.

ⓒ square. ⓓ rectangle.

3 The measure of the exterior angle of a triangle ..... the sum of the measures of its non adjacent interior angles.

ⓐ > ⓑ <

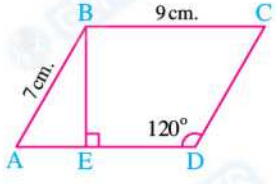
ⓒ ≠ ⓓ =

2 In the opposite figure : (2 marks)

ABCD is a parallelogram in which :

m (∠ ADC) = 120° , $\overline{BE} \perp \overline{AD}$

, AB = 7 cm. , BC = 9 cm.



Find by proof : 1 m (∠ C)

2 m (∠ ABE)

3 The perimeter of the parallelogram ABCD

Test 4

Total mark 5

1 Choose the correct answer : (3 marks)

1 In Δ ABC : if m (∠ A) > m (∠ B) + m (∠ C) , then the angle A is .....

ⓐ acute. ⓑ right.

ⓒ obtuse. ⓓ straight.

2 ABCD is a parallelogram in which m (∠ A) + m (∠ C) = 160°

, then m (∠ B) = ...

ⓐ 80° ⓑ 50°

ⓒ 100° ⓓ 120°

3 The square is a ..... with a right angle.

ⓐ rectangle ⓑ rhombus

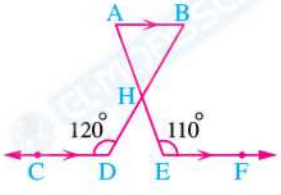
ⓒ parallelogram ⓓ trapezium

2 In the opposite figure : (2 marks)

$\overline{AB} // \overrightarrow{DC} // \overrightarrow{EF}$, $\overline{BD} \cap \overline{AE} = \{H\}$

, m (∠ E) = 110°

, m (∠ D) = 120°



Find with proof : m (∠ EHD)

Test 5

Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 The rectangle whose two diagonals are perpendicular is called .....

(a) square. (b) rhombus.

(c) rectangle. (d) trapezium.

2 In Δ ABC : if m (∠ B) = 2 m (∠ C) = 60° , then the triangle is ..... triangle.

(a) acute-angled (b) equilateral

(c) obtuse-angled (d) right-angled

3 If ABCD is a rhombus in which m (∠ ACB) = 32° , then m (∠ D) = ...

(a) 32° (b) 64°

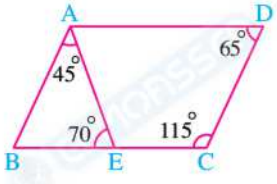
(c) 116° (d) 26°

2 In the opposite figure : (2 marks)

m (∠ BAE) = 45° , m (∠ AEB) = 70°

, m (∠ D) = 65° , m (∠ C) = 115°

Prove that : ABCD is a parallelogram.



Answers of Test 1

1 1 (b) 2 (b) 3 (d)

2 $\because (XY)^2 = 100\ cm^2$ $\therefore XY = \sqrt{100} = 10$ cm.

, $\because (YZ)^2 = 121\ cm^2$ $\therefore YZ = \sqrt{121} = 11$ cm.

$\therefore XY + YZ = 10 + 11 = 21$ cm.

Answers of Test 2

1 1 (a) 2 (d) 3 (a)

2 The expression $= 10^4 (5.4 + 3.7 \times 10) = 10^4 (5.4 + 37) = 42.4 \times 10^4 = 4.24 \times 10^5$

Answers of Test 3

1 1 (d) 2 (b) 3 (d)

2 $\because$ The area of the triangle $= \frac{1}{2} \times 8 \times 9 = 36\ cm^2$ $\therefore$ The area of the square $= 36\ cm^2$

$\therefore$ The side length of the square $= \sqrt{36} = 6$ cm.

Answers of Test 4

1 1 (c) 2 (a) 3 (d)

2 [a] $60000 \times 5000 = 300\,000\,000 = 3 \times 10^8$

[b] $\left(\frac{-2}{3}\right)^2 - \sqrt{\frac{16}{81}} + \left(\frac{1}{2}\right)^0 = \frac{4}{9} - \frac{4}{9} + 1 = 1$

Answers of Test 5

1 1 (b) 2 (b) 3 (a)

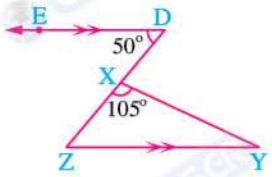
2 [a] The expression $= \frac{3.8}{1.9} \times \frac{10^8}{10^6} = 2 \times 10^2$

[b] $\left(\frac{-3}{7}\right)^0 \times \left(\frac{-2}{5}\right)^2 \times \sqrt{\frac{25}{4}} = 1 \times \frac{4}{25} \times \frac{5}{2} = \frac{2}{5}$

Answers of Test 1

1 1 (b) 2 (b) 3 (c)

2 ∵ $\overrightarrow{DE}$ // $\overline{YZ}$, $\overleftrightarrow{DZ}$ is a transversal to them



∴ m (∠ D) = m (∠ Z) = 50° (alternate angles)

∵ The sum of the measures of the interior angles of the triangle = 180°

∴ m (∠ Y) = 180° – (105° + 50°) = 25°

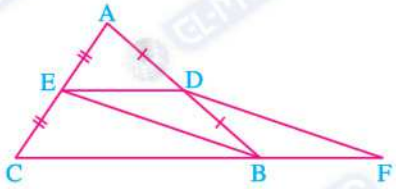
, ∵ ∠ YXD is an exterior angle of Δ XYZ

∴ m (∠ YXD) = 50° + 25° = 75° (The req.)

Answers of Test 2

1 1 (a) 2 (c) 3 (b)

2 In Δ ABC :



∵ D is the midpoint of $\overline{AB}$, E is the midpoint of $\overline{AC}$

∴ $\overline{DE}$ // $\overline{BC}$

, ∵ F ∈ $\overrightarrow{CB}$

∴ $\overline{DE}$ // $\overline{BF}$ (1)

, ∵ $DE = \frac{1}{2} BC$, $BF = \frac{1}{2} BC$

∴ DE = BF (2)

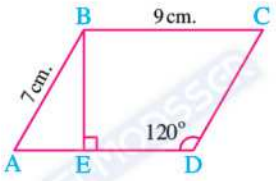
From (1) and (2) :

∴ BEDF is a parallelogram. (Q.E.D.)

Answers of Test 3

1 1 (b) 2 (c) 3 (d)

2 ∵ ABCD is a parallelogram



∴ m (∠ C) + m (∠ D) = 180°

∴ m (∠ C) = 180° – 120° = 60° (First req.)

∵ m (∠ A) = m (∠ C) = 60°

, In Δ ABE : m (∠ ABE) = 180° – (90° + 60°) = 30° (Second req.)

, the perimeter of the parallelogram ABCD = (9 + 7) × 2 = 32 cm. (Third req.)

Answers of Test 4

1 1 (c) 2 (c) 3 (b)

2 $\because \overline{AB} // \overrightarrow{DC}$, $\overline{BD}$ is a transversal to them.

$\therefore m(\angle B) + m(\angle D) = 180°$

(Two interior angles in the same side of the transversal)

$\therefore m(\angle B) = 180° - 120° = 60°$

, $\because \overline{AB} // \overrightarrow{EF}$, $\overline{AE}$ is a transversal to them.

$\therefore m(\angle A) + m(\angle E) = 180°$

(Two interior angles in the same side of the transversal)

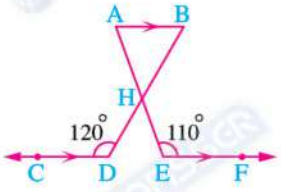
$\therefore m(\angle A) = 180° - 110° = 70°$

$\therefore$ In Δ BHA :

$m(\angle BHA) = 180° - (60° + 70°) = 50°$

$\because \overline{BD} \cap \overline{AE} = \{H\}$

$\therefore m(\angle EHD) = m(\angle BHA) = 50°$ (V.O.A) (The req.)



Answers of Test 5

1 1 (a) 2 (d) 3 (c)

2 In Δ ABE : $m(\angle B) = 180° - (45° + 70°) = 65°$

, $\because m(\angle D) + m(\angle C) = 65° + 115° = 180°$

and they are interior angles in the same side of the transversal

$\therefore \overline{AD} // \overline{BC}$ (1)

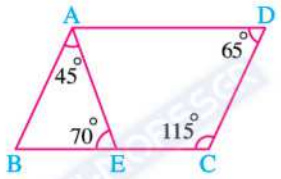
, $\because m(\angle B) + m(\angle C) = 65° + 115° = 180°$

and they are interior angles in the same side of the transversal

$\therefore \overline{AB} // \overline{CD}$ (2)

, from (1) and (2) :

$\therefore$ ABCD is a parallelogram. (Q.E.D.)



Accumulative test 4 till lesson 4 – unit 1

1 Choose the correct answer from those given :

1 $13400000 = 1.34 \times$ .....

(a) 10^7 (b) 10^{-7} (c) 10^6 (d) 10^{-6}

2 If $0.00043 = 4.3 \times 10^{x}$, then $x =$ .....

(a) 4 (b) 5 (c) – 4 (d) – 5

3 If $0.7 \times 0.005 = 3.5 \times 10^{n}$, then n = ...

(a) – 4 (b) 4 (c) – 3 (d) 3

4 The standard form of the number : 750×10^{-6} is .....

(a) 7.5×10^{-8} (b) 7.5×10^{-7} (c) 7.5×10^{-4} (d) 7.5×10^4

5 If $\frac{x}{y} = 0.3$, then $\left(\frac{x}{y}\right)^2 =$ .....

(a) $\frac{3}{100}$ (b) $\frac{9}{10}$ (c) $\frac{3}{10}$ (d) $\frac{9}{100}$

6 The quarter of the number 4^{20} is .....

(a) 4^5 (b) 4^{10} (c) 4^{19} (d) 2^{10}

7 $2^{-1} + 4^{-1} =$ .....

(a) 0.20 (b) 0.40 (c) 0.60 (d) 0.75

8 Which of the following is the greatest ?

(a) 2.3×10^4 (b) 2.3×10^5 (c) 3.2×10^4 (d) 3.2×10^5

---

2 [a] Find the result of : 60000×5000 in the standard form.

[b] Find in the standard form the result of : $(18 \times 10^9) \div (3 \times 10^4)$

---

3 [a] Calculate the value of : $\left(\frac{9^3 \times 9}{9^5}\right)^{-3}$

[b] Write the result in the standard form : $(5.8 \times 10^3) + (3.2 \times 10^2)$

Accumulative test 6 till lesson 6 – unit 1

1 Choose the correct answer from those given :

1 $\sqrt{36}+\sqrt{16}=$ .....

(a) 25 (b) 100 (c) 10 (d) 64

2 If $x = 0.0009$, then : $\sqrt{x}=$ .....

(a) 0.0003 (b) 0.0081 (c) 0.003 (d) 0.03

3 The sum of the two square roots of the number 49 is .....

(a) 7 (b) 14 (c) – 4 (d) zero

4 $\sqrt{(-8)^2+(-6)^2}=$ .....

(a) 10 (b) ± 10 (c) 14 (d) – 14

5 $2\times6-4\div2=$ .....

(a) 4 (b) 8 (c) 10 (d) 2

6 Third the number 3^9 is .....

(a) 3^3 (b) 3^5 (c) 3^6 (d) 3^8

7 The side length of the square whose area is $9x^2$ cm^2 is .....

(a) $|3x|$ (b) $3x^2$ (c) $9x$ (d) $9x^2$

8 The multiplicative inverse of the number $\sqrt{2\frac{1}{4}}$ is .....

(a) $\frac{9}{4}$ (b) $\frac{3}{2}$ (c) $\frac{2}{3}$ (d) $\frac{4}{9}$

---

2 [a] Simplify to the simplest form : $\left(\frac{-3}{7}\right)^{\text{zero}}\times\left(-\frac{5}{2}\right)^{-2}\times\sqrt{6\frac{1}{4}}$

[b] Simplify to the simplest form : $\frac{2^8\times2^{-7}}{2^{-2}\times2^3}$

---

3 In Δ ABC If $(AB)^2 = 16$ cm^2 , $(BC)^2 = 25$ cm^2 , then find : AB + BC

April Tests

Model 1

Total Mark 10

Answer the following questions :

1 Choose the correct answer from the given ones : **(3 Marks)**

1 $6^2 + 6 \times 6 \div 6 - 6 =$ .....

(a) 6 (b) 12 (c) 1 (d) 6^2

2 If the age of a man now is x years , then his age 3 years ago is ..... years.

(a) $3x$ (b) $x - 3$ (c) $3 + x$ (d) $\frac{x}{3}$

3 The sum of the two square roots of 25 is .....

(a) 5 (b) ± 5 (c) zero (d) 10

---

2 Complete : **(3 Marks)**

1 $a = \frac{1}{3}$, $b = 1\frac{1}{3}$, then $\sqrt{a\,b} =$ .....

2 $\sqrt{1} + \sqrt{4} + \sqrt{9} + \sqrt{36} =$ .....

3 If $b > a$, then $b + 3$ ..... $a + 3$

---

3 Find in $\mathbb{Q}$ the S.S. of : **(2 Marks)**

$2 - 3x \leq 7$

---

4 Simplify to the simplest form : **(2 Marks)**

$\left(\frac{2}{5}\right)^{-2} \times \sqrt{\frac{4}{25}} \times 2$

Model 2

Total Mark 10

Answer the following questions :

1 Choose the correct answer from the given ones : **(3 Marks)**

1 The negative square root of 49 is .....

(a) 7 (b) -7 (c) ± 7 (d) $|-7|$

2 If $3 \mathcal{X} y = 21$, then $7 \mathcal{X} y =$ .....

(a) 21 (b) 147 (c) 49 (d) 10

3 The side length of the square whose area $36 \mathcal{X}^2$ cm^2 is ..... cm.

(a) $18 \mathcal{X}$ (b) $|6 \mathcal{X}|$ (c) $9 \mathcal{X}$ (d) $6 \mathcal{X}^2$

2 Complete : **(3 Marks)**

1 $2 \times 5 - 6 \div 2 =$ .....

2 $\sqrt{\sqrt{25} + 2^2} =$ .....

3 Two integers their sum is 6 , if one of them is $\mathcal{X}$, then the other integer is .....

3 Find in $\mathbb{Q}$ the S.S. of : $2 + 3 \mathcal{X} = 4$ **(2 Marks)**

4 Three consecutive integers , their sum is 42 **(2 Marks)**

Find the numbers.

Accumulative test 3 till lesson 3 – unit 3

1 Choose the correct answer from those given :

1 In a parallelogram , every two opposite angles are .....

(a) equal in measure. (b) complementary angles.

(c) supplementary angles. (d) vertically opposite angles.

2 If ABCD is a parallelogarm in which BC = 8 cm. , CD = 6 cm. , then its perimeter equals ..... cm.

(a) 14 (b) 28 (c) 48 (d) 56

3 ABCD is a parallelogram in which m (∠ A) + m (∠ C) = 160°

, then m (∠ B) = ...

(a) 20° (b) 80° (c) 100° (d) 110°

4 The angle whose measure is 70° is vertically opposite an angle of measure .....

(a) 110° (b) 70° (c) 80° (d) 180°

5 The measure of the interior angle of a regular hexagon equals .....

(a) 60° (b) 108° (c) 120° (d) 135°

6 The sum of measures of the interior angles of a polygon of n sides equals .....

(a) $n \times 180$ (b) $(n-2) \times 180°$ (c) $\frac{(n-2) \times 180}{n}$ (d) $\frac{(n-2) \times 180°}{2n}$

7 ABCD is a parallelogram in which m (∠ A) = $\frac{1}{2}$ m (∠ B)

, then m (∠ B) = ...

(a) 30° (b) 60° (c) 90° (d) 120°

8 ABCD is a parallelogram in which m (∠ B) = 2 m (∠ C) , then m (∠ D) = ...

(a) 30° (b) 60° (c) 90° (d) 120°

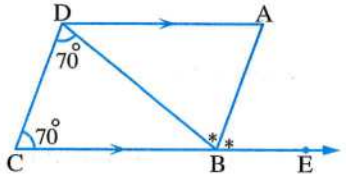
---

2 In the opposite figure :

$\overline{DA} \parallel \overleftrightarrow{CB}$, $E \in \overrightarrow{CB}$, m (∠ EBA) = m (∠ ABD)

, m (∠ BDC) = m (∠ C) = 70°

Proof that : the figure ABCD is a parallelogram



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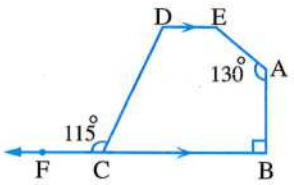
3 $F \in \overrightarrow{BC}$, $\overline{ED} \parallel \overrightarrow{BC}$, m (∠ DCF) = 115° , m (∠ A) = 130°

, m (∠ B) = 90°

Find by proof : m (∠ E)



Accumulative test 4 till lesson 4 – unit 3

1 Choose the correct answer from those given :

1 The parallelogram whose two diagonals are perpendicular is called .....

(a) square (b) rectangle

(c) rhombus (d) otherwise

2 The quadrilateral in which only two sides are parallel is called a .....

(a) parallelogram (b) square (c) rhombus (d) trapezium

3 In the rectangle , the two diagonals are .....

(a) parallel (b) perpendicular

(c) equal in length (d) equal in length and perpendicular

4 If the measure of an interior angle of a regular polygon is 144° , then the number of its sides is .....

(a) 4 sides. (b) 6 sides. (c) 8 sides. (d) 10 sides.

5 ABCD is a parallelogram in which m (∠ B) = 75° , then m (∠ C) = ...

(a) 15° (b) 75° (c) 90° (d) 105°

6 The perimeter of a rhombus is 24 cm. , then its side length is ..... cm.

(a) 6 (b) 3 (c) 8 (d) 12

7 The polygon in which the number of sides = the number of diagonals is called .....

(a) triangle. (b) quadrilateral. (c) pentagon. (d) hexagon.

8 The square is ..... one of its angles is right.

(a) rectangle. (b) parallelogram. (c) rhombus. (d) trapezium.

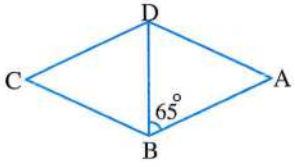
---

2 In the opposite figure :

ABCD is a rhombus in which

m (∠ ABD) = 65°

Find : m (∠ A)



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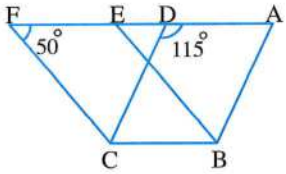
3 In the opposite figure :

ABCD , EBCF are two parallelograms

, m (∠ F) = 50° , m (∠ ADC) = 115°

Calculate : m (∠ ABE)



Accumulative test 5 till lesson 5 – unit 3

1 Choose the correct answer from those given :

1 The measure of the exterior angle of the equilateral triangle equals .....

(a) 90° (b) 60° (c) 30° (d) 120°

2 The least number of acute angles in any triangle equals .....

(a) zero (b) 1 (c) 2 (d) 3

3 ABC is a triangle in which m (∠ B) = m (∠ C) = 45° , then m (∠ A) = ...

(a) 45° (b) 180° (c) 90° (d) 135°

4 XYZL is a parallelogram in which m (∠ X) = 50° , then m (∠ Y) = ...

(a) 90° (b) 130° (c) 40° (d) 50°

5 The rhombus whose two consecutive angles have the same measure is called .....

(a) parallelogram. (b) rectangle. (c) square. (d) trapezium.

6 The sum of measures of the interior angles of the pentagon equals .....

(a) 180° (b) 360° (c) 540° (d) 720°

7 It is possible to draw a triangle each of its interior angles is of measure .....

(a) 50° (b) 60° (c) 70° (d) 180°

8 ABC is a triangle in which m (∠ A) = $3x°$, m (∠ C) = $4x°$, m (∠ B) = $7x°$, then ∠ B is ..... angle.

(a) an acute. (b) an obtuse. (c) a right. (d) a reflex.

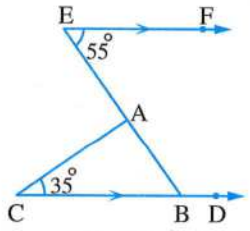
---

2 In the opposite figure :

$\overrightarrow{EF} // \overrightarrow{CD}$, m (∠ E) = 55°

, m (∠ C) = 35°

Find each of : m (∠ BAC) , m (∠ ABD)



---

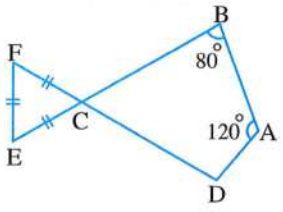
3 In the opposite figure :

ABCD is a quadrilateral , m (∠ A) = 120°

, m (∠ B) = 80°

, Δ CEF is an equilateral triangle.

Find by proof : m (∠ D)



Accumulative test 6 till lesson 6 – unit 3

1 Choose the correct answer from those given :

1 The length of the line segment joining the midpoints of two sides of a triangle is equal to ..... the length of the third side.

(a) twice (b) half (c) quarter (d) greater than

2 The line segment joining the midpoints of two sides of a triangle is ..... to the third side.

(a) parallel (b) intersecting (c) perpendicular (d) congruent

3 The ray drawn from the midpoint of a side of a triangle parallel to another side ..... the third side.

(a) parallel to (b) bisects (c) equals (d) perpendicular to

4 ABCD is a parallelogram in which m ($\angle$ A) = 50° , then m ($\angle$ C) = ...

(a) 50° (b) 130° (c) 180° (d) 90°

5 The measure of an interior angle of a regular polygon = 108° , then the number of its sides is .....

(a) 4 (b) 5 (c) 6 (d) 7

6 If ABCD is a square , then m ($\angle$ CAB) = ...

(a) 30° (b) 45° (c) 60° (d) 90°

7 Δ ABC is an equilateral triangle whose perimeter = 12 cm. , if X , Y and Z are the midpoints of its sides , then the perimeter of Δ XYZ = ... cm.

(a) 12 (b) 6 (c) 4 (d) 3

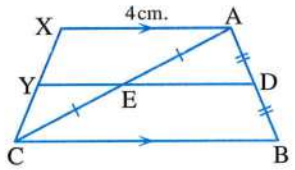
8 The ratio between the length of the line segment joining the midpoints of two sides of a triangle and the length of the third side equals .....

(a) 1 : 2 (b) 2 : 1 (c) 1 : 3 (d) 2 : 3

---

2 In the opposite figure :

AD = DB , AE = EC , AX = 4 cm. , $\overline{AX} \parallel \overline{BC}$, $\overrightarrow{DE} \cap \overline{XC} = \{Y\}$



1 **Proof that :** Y is the midpoint of $\overline{XC}$

2 **Find :** the length of $\overline{EY}$

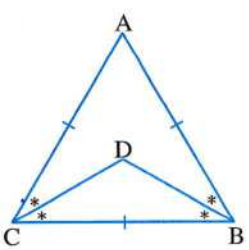
---

3 In the opposite figure :

ABC is a triangle in which : AB = AC = BC

, $\overrightarrow{BD}$ bisects $\angle$ ABC , $\overrightarrow{CD}$ bisects $\angle$ ACB

Find by proof : m ($\angle$ BDC)



April Tests

Model 1

Total Mark 10

Answer the following questions :

1 Choose the correct answer from the given ones : **(3 Marks)**

1 The meausre of the exterior angle of the quilateral triangle equals .....

(a) 120° (b) 60° (c) 180° (d) 108°

2 In Δ XYZ : M is the midpoint $\overline{XY}$, L is the midpoint of $\overline{XZ}$, ML = 7 cm. , then YZ = ... cm.

(a) 3.5 (b) 7 (c) 14 (d) 21

3 A rectangle of length 20 cm. , and the diagonal length is 25 cm. , then its width is ..... cm.

(a) 5 (b) 45 (c) 15 (d) 30

---

2 Complete : **(3 Marks)**

1 The ray drawn from the midpoint of a side in a triangle parallel to another side .....

2 In Δ ABC : if m (∠ A) + m (∠ B) = 80° , then m (∠ C) = ...°

3 In Δ ABC : if m (∠ A) + m (∠ C) < m (∠ B) , then ∠ B is .....

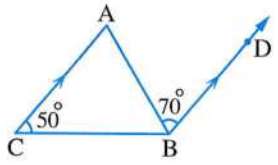
---

3 In the opposite figure : **(2 Marks)**

$\overrightarrow{BD}$ // $\overline{CA}$, m (∠ C) = 50°

, m (∠ ABD) = 70°

Find : m (∠ ABC)



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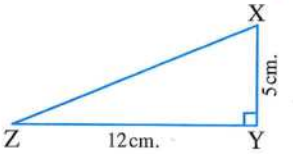
4 In the opposite figure : **(2 Marks)**

XYZ is a right-angled triangle at Y

, XY = 5 cm. , YZ = 12 cm.

Find : The length of $\overline{XZ}$



Model 2

Total Mark 10

Answer the following questions :

1 Choose the correct answer from the given ones : **(3 Marks)**

1 The sum of measures of the exterior angles of a triangle equals .....

(a) 108° (b) 360° (c) 180° (d) 90°

2 In Δ ABC , $m(\angle A) = 2x^\circ$, $m(\angle B) = x^\circ$, $m(\angle C) = 3x^\circ$, then Δ ABC is .....

(a) acute-angled triangle. (b) obtuse-angled triangle.

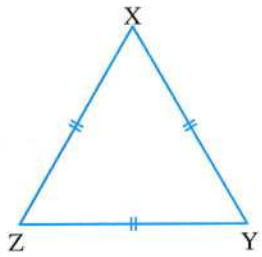
(c) right-angled triangle. (d) equilateral triangle.

3 **In the opposite figure :**

If XYZ is an equilateral triangle , then $m(\angle Y)$ = ...

(a) 108° (b) 180°

(c) 120° (d) 60°



2 Complete : **(3 Marks)**

1 The area of the square drawn on the hypotenuse of the right-angled triangle equals .....

2 Any triangle has two ..... angle at least.

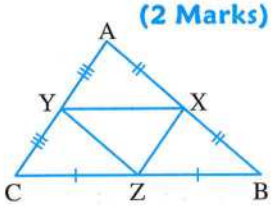
3 The length of the line segment drawn between the midpoints of two sides in a triangle equals .....

3 In the opposite figure : **(2 Marks)**

ABC is a triangle in which :

X , Y , Z are the midpoints of $\overline{AB}$, $\overline{AC}$, $\overline{BC}$ respectively

Prove that : The perimeter of Δ XYZ = $\frac{1}{2}$ the perimeter of Δ ABC

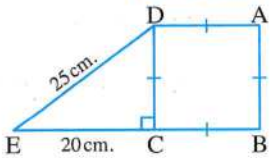


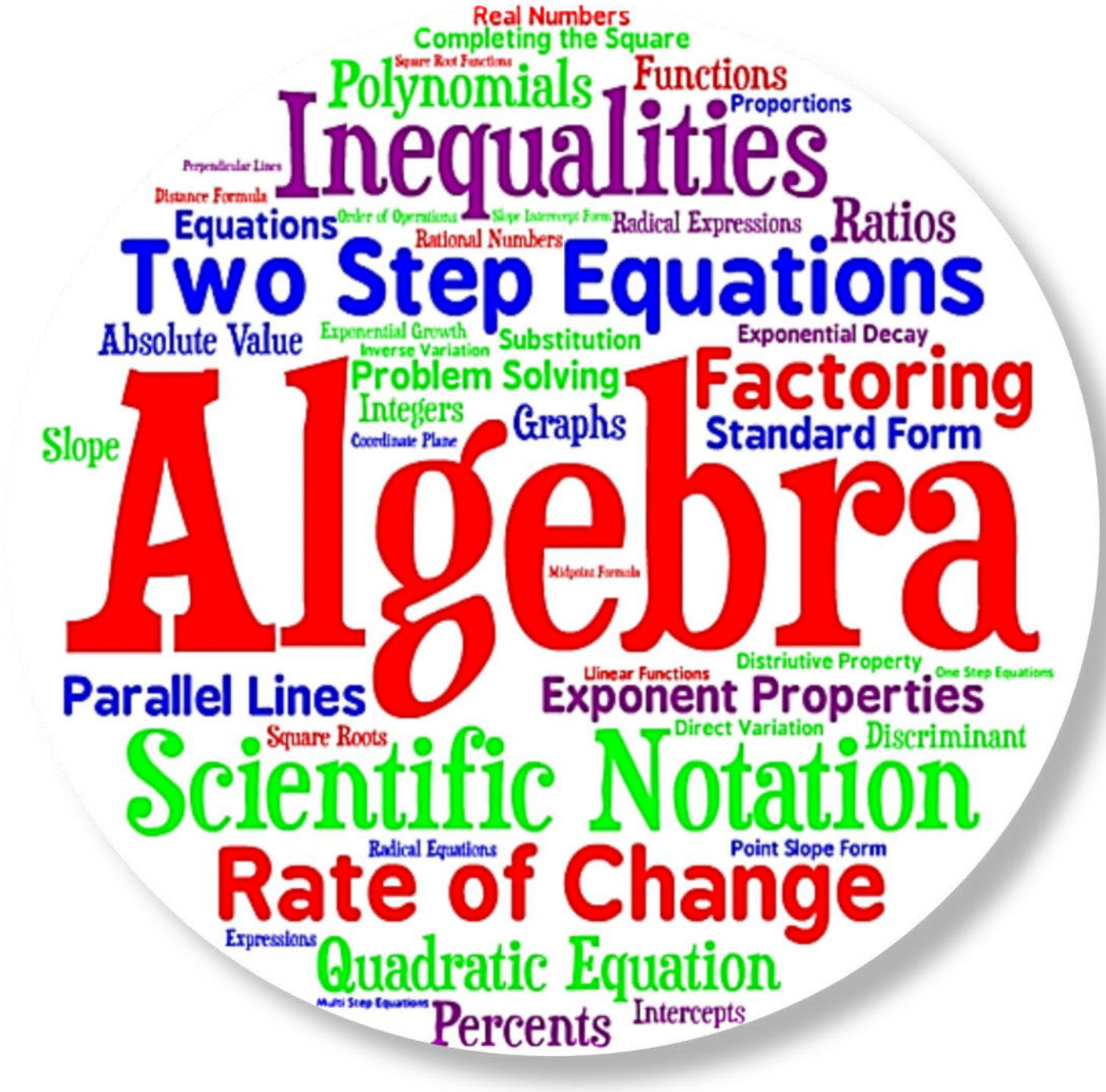
4 In the opposite figure : **(2 Marks)**

$\overline{DC} \perp \overleftrightarrow{BC}$, DE = 25 cm.

, CE = 20 cm.

Find : The area of the square ABCD





6. The square root of a perfect square rational number.

7. Solving equations in $\mathbb{Q}$

1. Choose the correct answer:

1 $\sqrt{1\frac{9}{16}} =$ .....

(a) $1\frac{3}{4}$ (b) $-1\frac{3}{4}$ (c) $1\frac{1}{4}$ (d) $-1\frac{1}{4}$

2 $\sqrt{10^2-6^2} =$ .....

(a) 4 (b) 8 (c) ± 4 (d) ± 8

3 $\sqrt{18\times10\times10\times18} =$ .....

(a) 18 (b) 180 (c) 10 (d) 100

4 $\sqrt{\sqrt{81}} =$ .....

(a) 81 (b) 27 (c) 9 (d) 3

5 $\sqrt{2^2+\sqrt{25}} =$ .....

(a) 3 (b) -3 (c) 9 (d) -9

6 If $\frac{x}{2} = \frac{8}{x}$, then $x =$ .....

(a) 4 (b) -4 (c) ± 4 (d) 16

7 If $x=\sqrt{\frac{1}{4}}$, then $x^3 =$ .....

(a) $\frac{3}{8}$ (b) $\frac{1}{8}$ (c) $\frac{1}{16}$ (d) $\frac{1}{64}$

8 $\sqrt{(a+b)^3(a+b)} =$ .....

(a) $(a+b)^2$ (b) a^4+b^4 (c) $-(a+b)^2$ (d) $\pm(a+b)^2$

9 $\sqrt{1}+\sqrt{4}+\sqrt{9}+\sqrt{16}+\sqrt{25}+\sqrt{36}+\sqrt{49}+\sqrt{64} =$ .....

(a) 6 (b) $\sqrt{204}$ (c) $\sqrt{81}$ (d) 6^2

10 The side length of the square whose area is $16x^2$ cm.^{2} equals ..... cm.

(a) $8x$ (b) $|4x|$ (c) $2x$ (d) $8x^2$

11 If $2x = 2$, then $3x - 1 =$ .....

(a) 2 (b) 3 (c) 4 (d) 5

12 If $2x = 0$, then $x =$ .....

(a) 2 (b) 3 (c) 5 (d) zero

13 If $2ab = 10$, then $3ab =$ .....

(a) 5 (b) 6 (c) 15 (d) 30

14 If $0.2 + a = 5$, then $\frac{a}{4} =$ .....

(a) 4.8 (b) 1.3 (c) 1.2 (d) 19.2

15 If $5x + 8x + 2x + 4x = 114$, then $5x + 3 =$ .....

(a) 33 (b) 35 (c) 47 (d) $8x$

16 The S.S. of the equation $\frac{2a}{3} = 8 + 4a$ in $\mathbb{Q}$ is .....

(a) $\{-2.4\}$ (b) $\{2.4\}$ (c) $\{-3\frac{1}{3}\}$ (d) $\{0\}$

17 Which of the following equations is equivalent to the equation $x + 3 = 12$?

(a) $x - 3 = -12$ (b) $x + (-3) = 12$

(c) $x - (-3) = 12$ (d) $x - (-3) = -12$

18 Which of the following equations is equivalent to the equation $x - 12 = 15$?

(a) $x + 12 = -15$ (b) $\frac{1}{3}x - 4 = 5$ (c) $x - 4 = -5$ (d) $x + 4 = 5$

2. Answer the following:

1 Find the value of : $\sqrt{\frac{25}{16}} \times \frac{2}{5}$

2 If $x = 9$, $y = 7$, find the value of : $\sqrt{2x + y}$

3 Simplify to the simplest form : $\sqrt{11\frac{5}{4}} \times \left(\frac{2}{7}\right)^{\text{zero}} \times \left(\frac{-2}{7}\right)^2$

4 Simplify to the simplest form : $\sqrt{6\frac{1}{4}} + \frac{1}{5}\sqrt{16+9}$

5 Simplify to the simplest form : $\left(\frac{-1}{3}\right)^2 + \left(\frac{-2}{3} \times \frac{3}{5}\right)^{\text{zero}} \times \sqrt{\frac{64}{81}}$

6 Find in the simplest form : $\left(\frac{-1}{5}\right)^2 + \sqrt{\left(\frac{-24}{25}\right)^2} - \left(\frac{3}{15}\right)^{-1}$

7 Find in the simplest form : $\sqrt{\frac{25x^2y^2}{36}}$

8 Find the number if added to its three times the result will be 32

9 Find the S.S. of the equation : $2x - 1 = 5$ where $x \in \mathbb{Q}$

10 Find the S.S. in $\mathbb{Q}$ of the equation : $2(x - 5) = 12$

11 Find the S.S. in $\mathbb{Q}$ of the equation : $(3x + 2) - 5 = 12$

The Answers

Choose

1	C	10	B
2	B	11	A
3	B	12	D
4	D	13	C
5	A	14	C
6	C	15	A
7	B	16	A
8	A	17	C
9	D	18	B

Problems

1 $\frac{5}{4} \times \frac{2}{5} = \frac{1}{2}$

2 $\sqrt{2x+y} = \sqrt{2\times 9+7} = \sqrt{25} = 5$

3 $\sqrt{\frac{49}{4}} \times \left(\frac{2}{7}\right)^{\text{zero}} \times \left(\frac{-2}{7}\right)^2 = \frac{7}{2} \times 1 \times \frac{4}{49} = \frac{2}{7}$

4 $\sqrt{\frac{25}{4}} + \frac{1}{5}\sqrt{25} = \frac{5}{2} + \frac{1}{5} \times 5 = \frac{5}{2} + 1 = \frac{7}{2}$

5 $\frac{1}{9} + 1 \times \frac{8}{9} = \frac{1}{9} + \frac{8}{9} = 1$

6 $\frac{1}{25} + \frac{24}{25} - \frac{15}{3} = \frac{25}{25} - 5 = 1 - 5 = -4$

7 $\left|\frac{5xy}{6}\right|$

8 Let the number be x ∴ its triple $= 3x$

∴ $3x + x = 32$ ∴ $4x = 32$

∴ $x = \frac{32}{4} = 8$ ∴ The number is 8

9 ∵ $2x - 1 = 5$ ∴ $2x = 6$

∴ $x = 3$ ∴ The S.S. $= \{3\}$

10 $2x - 10 = 12$ ∴ $2x = 22$

∴ $x = 11$ ∴ The S.S. $= \{11\}$

11 ∵ $3x - 3 = 12$ ∴ $3x = 15$

∴ $x = 5$ ∴ The S.S. $= \{5\}$

Model 1

Total Mark 5

1 Choose the correct answer from the given ones : **(3 Marks)**

1 The additive inverse of the number $\sqrt{\frac{4}{9}}$ is .....

(a) $\frac{4}{9}$ (b) $\frac{2}{3}$ (c) $-\frac{2}{3}$ (d) $-\frac{4}{9}$

2 If the age of a man now is x years , then his age 3 years ago is ..... years.

(a) $3x$ (b) $x-3$ (c) $3+x$ (d) $\frac{x}{3}$

3 The sum of the two square roots of 25 is .....

(a) 5 (b) ± 5 (c) zero (d) 10

---

2 Simplify to the simplest form : **(2 Marks)**

$$\left(\frac{2}{5}\right)^{-2} \times \sqrt{\frac{4}{25}} \times 2$$

Model 2

Total Mark 5

1 Choose the correct answer from the given ones : **(3 Marks)**

1 The negative square root of 49 is .....

(a) 7 (b) -7 (c) ± 7 (d) $|-7|$

2 If $3x\,y = 21$, then $7x\,y =$ .....

(a) 21 (b) 147 (c) 49 (d) 10

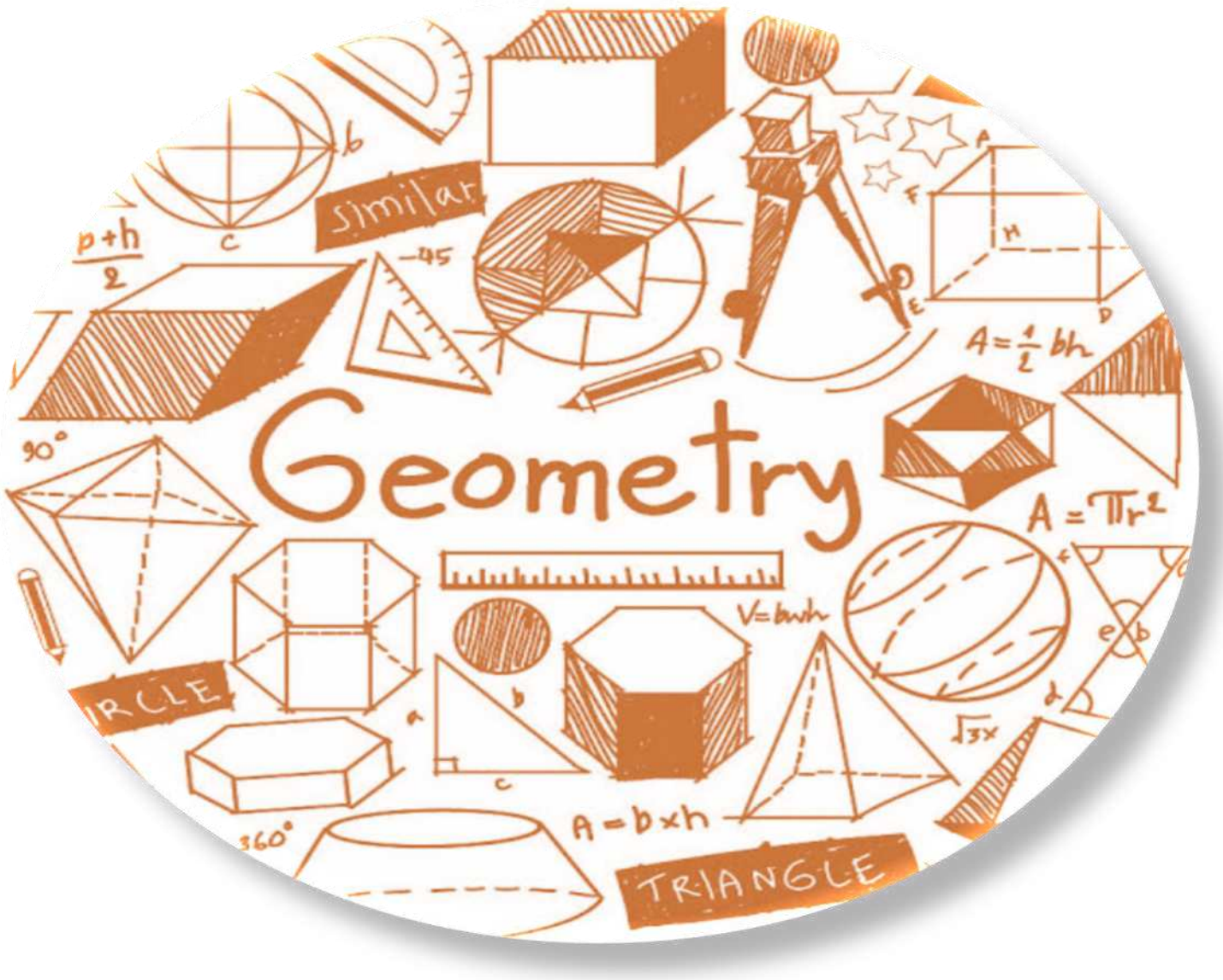
3 The side length of the square whose area $36x^2$ cm^2 is ..... cm.

(a) $18x$ (b) $|6x|$ (c) $9x$ (d) $6x^2$

---

2 Three consecutive integers , their sum is 42 **(2 Marks)**

Find the numbers.



3. The parallelogram and its properties.
4. The special cases of the parallelogram.
5. The triangle : Theorem (1) , exterior angle of the triangle.
6. Theorem (2) , theorem (3).

1. Choose the correct answer:

1 The sum of measures of two consecutive angles in the parallelogram is .....

(a) 90° (b) 180° (c) 120° (d) 360°

2 The parallelogram whose angle is right is called .....

(a) square. (b) rhombus. (c) rectangle. (d) trapezium.

3 If two adjacent sides are equal in a parallelogram , then the figure is .....

(a) square. (b) rhombus. (c) rectangle. (d) trapezium.

4 ABCD is a parallelogram in which m (∠ A) + m (∠ C) = 140° , then m (∠ B) = ...

(a) 40° (b) 140° (c) 110° (d) 70°

5 The two diagonals are equal in length and perpendicular in .....

(a) rhombus. (b) rectangle. (c) square. (d) parallelogram.

6 The two diagonals are equal in length and not perpendicular in .....

(a) square. (b) rectangle. (c) rhombus. (d) parallelogram.

7 The diagonal of the square divides the vertex angle into two angles , the measure of each of them is .....

(a) 45° (b) 30° (c) 90° (d) 60°

8 The diagonal of the square make an angle of measure ..... with any of its sides.

(a) 45° (b) 60° (c) 90° (d) 120°

9 ABCD is a parallelogram in which m (∠ A) = 50° , then m (∠ B) = ...

(a) 50° (b) 130° (c) 180° (d) 90°

10 The sum of measures of the interior angles of a triangle equals .....

(a) 180° (b) 360° (c) 90° (d) 270°

11 The sum of measures of the interior angles of a triangle equals the measure of ..... angle.

(a) right. (b) straight. (c) acute. (d) reflex.

12 Any triangle has at least two ..... angles.

(a) acute. (b) right. (c) obtuse. (d) straight.

---

13 ABC is a triangle in which m (∠ A) = m (∠ B) + m (∠ C) , then m (∠ A) = ...

(a) 180° (b) 108° (c) 90° (d) 360°

---

14 Δ ABC in which X , Y are midpoints of $\overline{AB}$, $\overline{AC}$, BC = 14 cm. , then XY = ...

(a) 7 cm. (b) 6 cm. (c) 4 cm. (d) 14 cm.

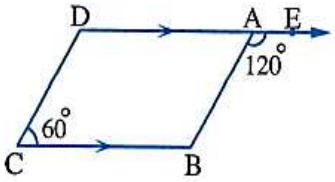
2. Answer the following:

1 **In the opposite figure :**

$E \in \overrightarrow{DA}$, $m(\angle EAB) = 120°$

, $m(\angle C) = 60°$, $\overrightarrow{DA} // \overline{CB}$

Prove that : ABCD is a parallelogram



2 **In the opposite figure :**

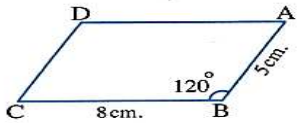
ABCD is a parallelogram

in which : AB = 5 cm.

, BC = 8 cm. , $m(\angle B) = 120°$

Find : [1] The perimeter of the parallelogram ABCD

[2] $m(\angle C)$



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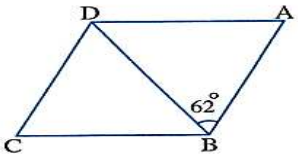
3 **In the opposite figure :**

ABCD is a rhombus in which :

, $m(\angle ABD) = 62°$

Find with proof : $m(\angle A)$



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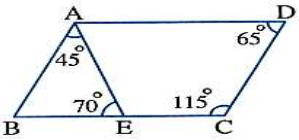
4 **In the opposite figure :**

$m(\angle BAE) = 45°$, $m(\angle AEB) = 70°$

, $m(\angle D) = 65°$, $m(\angle C) = 115°$

Prove that : ABCD is a parallelogram.



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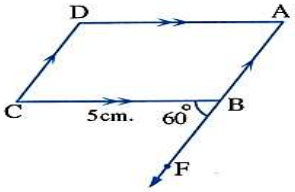
5 **In the opposite figure :**

ABCD is a parallelogram

, $m(\angle CBF) = 60°$

, BC = 5 cm. , $F \in \overrightarrow{AB}$

Find by proof : $m(\angle D)$, the length of $\overline{AD}$



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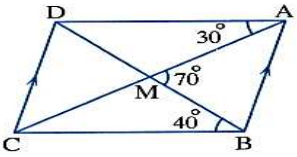
6 **In the opposite figure :**

$\overline{AB} // \overline{DC}$, $\overline{AC} \cap \overline{BD} = \{M\}$

, $m(\angle DAC) = 30°$, $m(\angle DBC) = 40°$

, $m(\angle AMB) = 70°$

Prove that : ABCD is a parallelogram.



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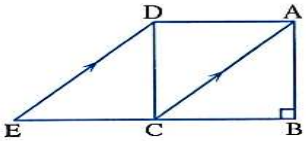
7 **In the opposite figure :**

ABCD ia a square , $E \in \overrightarrow{BC}$

where : $\overline{AC} // \overline{DE}$

Prove that : ACED is a parallelogram.

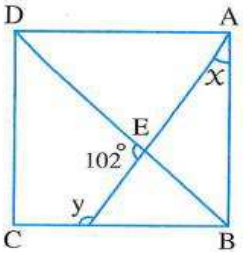


8 **In the opposite figure :**

ABCD is a square

Find by degree :

The value of each of x and y

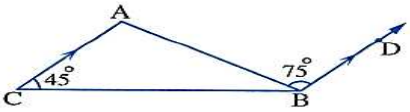


9 **In the opposite figure :**

$\overrightarrow{BD} // \overrightarrow{CA}$, m (∠ C) = 45°

, m (∠ ABD) = 75°

Find : m (∠ ABC)

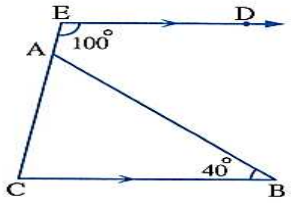


10 **In the opposite figure :**

$\overrightarrow{ED} // \overrightarrow{BC}$, m (∠ E) = 100°

, m (∠ B) = 40°

Find : m (∠ BAE)

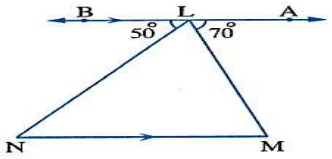


11 **In the opposite figure :**

$\overrightarrow{AB} // \overrightarrow{MN}$, m (∠ ALM) = 70°

, m (∠ BLN) = 50°

Find : The measure of each of the interior angles of Δ LMN

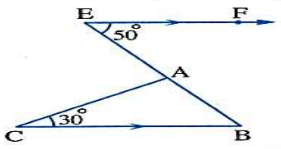


12 **In the opposite figure :**

$\overrightarrow{EF} // \overrightarrow{CB}$, m (∠ E) = 50°

, m (∠ C) = 30°

Find : The measures of the angles of Δ ABC

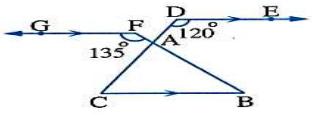


13 **In the opposite figure :**

$\overrightarrow{DE} // \overrightarrow{FG} // \overrightarrow{BC}$, m (∠ EDC) = 120°

, m (∠ GFB) = 135°

Find : The measures of the angles of Δ ABC



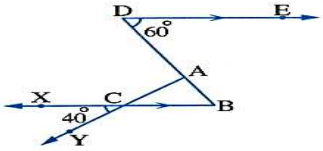
14 **In the opposite figure :**

$\overrightarrow{DE} // \overrightarrow{BC}$

, m (∠ D) = 60°

, m (∠ XCY) = 40°

Calculate : The measures of the angles of Δ ABC

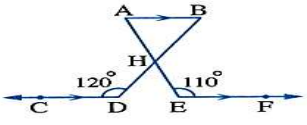


15 **In the opposite figure :**

$\overrightarrow{AB} // \overrightarrow{DC} // \overrightarrow{EF}$, m (∠ E) = 110°

, m (∠ D) = 120°

Find : m (∠ EHD)



16 **In the opposite figure :**

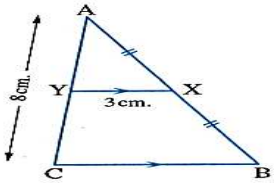
$\overline{XY} // \overline{BC}$

, X is the midpoint of $\overline{AB}$

, AC = 8 cm.

, XY = 3 cm.

Find : The length of each of $\overline{BC}$, $\overline{AY}$



17 **In the opposite figure :**

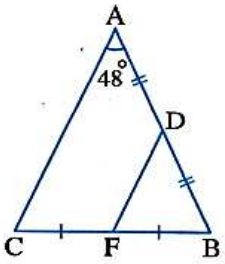
ABC is a triangle in which

D , F are the midpoints of $\overline{AB}$

, $\overline{BC}$ respectively

1 **Prove that :** $\overline{DF}$ // $\overline{AC}$

2 **If :** m (∠ A) = 48° , find m (∠ BDF)



---

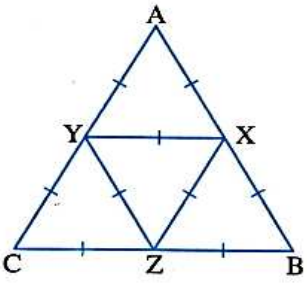
18 **In the opposite figure :**

ABC is an equilateral triangle in which : AB = 8 cm.

, X is the midpoint of $\overline{AB}$, Y is the midpoint of $\overline{AC}$

, Z is the midpoint of $\overline{BC}$

Find by proof : the perimeter of Δ XYZ



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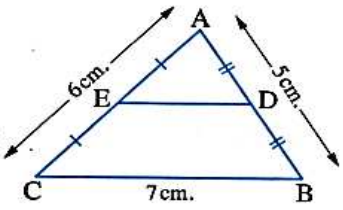
19 **In the opposite figure :**

ABC is a triangle in which : D is the midpoint of $\overline{AB}$

, E is the midpoint of $\overline{AC}$, if AB = 5 cm. , BC = 7 cm. , AC = 6 cm.

Find : The perimeter of the triangle ADE



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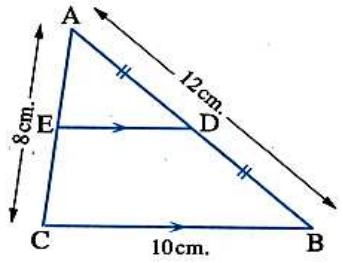
20 **In the opposite figure :**

ABC is a triangle in which :

D is the midpoint of $\overline{AB}$, $\overline{DE}$ // $\overline{BC}$, AB = 12 cm.

, BC = 10 cm. , AC = 8 cm.

Find : The perimeter of Δ ADE



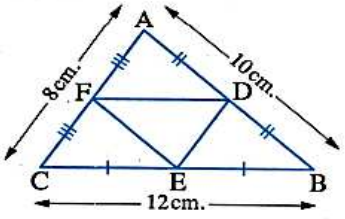
---

21 **In the opposite figure :**

AB = 10 cm. , BC = 12 cm. , AC = 8 cm.

, D , E , F are the midpoints of $\overline{AB}$, $\overline{BC}$, $\overline{AC}$ respectively.

Find : the perimeter of Δ DEF



---

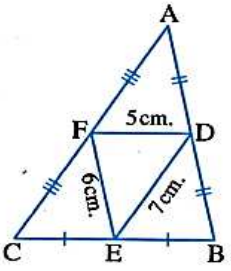
22 **In the opposite figure :**

D , E , F are the midpoints of

$\overline{AB}$, $\overline{BC}$, $\overline{AC}$ respectively

, DE = 7 cm. , EF = 6 cm. , DF = 5 cm.

Find by proof : The perimeter of Δ ABC



The Answers

Choose

1	B	10	A
2	C	11	B
3	B	12	A
4	C	13	C
5	C	14	A
6	B		
7	A		
8	A		
9	B		

Problems

1 $\because \overrightarrow{DE} // \overline{BC}$, $\overrightarrow{AB}$ is a transversal to them

$\therefore m(\angle B) = m(\angle BAE) = 120°$ (Alternate angles)

, $\because m(\angle B) + m(\angle C) = 120° + 60° = 180°$

and they are interior angles in the same side of the transversal

$\therefore \overline{AB} // \overline{CD}$, $\because \overline{AD} // \overline{BC}$

$\therefore$ ABCD is a parallelogram. (Q.E.D.)

2 The perimeter of the parallelogram ABCD

$= (AB + BC) \times 2$

$= (5 + 8) \times 2 = 13 \times 2 = 26$ cm. (First req.)

$\because$ ABCD is a parallelogram

$\therefore m(\angle B) + m(\angle C) = 180°$

$\therefore m(\angle C) = 180° - 120° = 60°$ (Second req.)

3 $\because$ ABCD is a rhombus , $\overline{BD}$ is a diagonal

$\therefore m(\angle ABC) = 2\, m(\angle ABD) = 2 \times 62° = 124°$

$\therefore m(\angle A) = 180° - 124° = 56°$ (The req.)

4 In Δ ABE : $m(\angle B) = 180° - (45° + 70°) = 65°$

, $\because m(\angle D) + m(\angle C) = 65° + 115° = 180°$

and they are interior angles in the same side of the transversal

$\therefore \overline{AD} // \overline{BC}$ (1)

, $\because m(\angle B) + m(\angle C) = 65° + 115° = 180°$

and they are interior angles in the same side of the transversal

$\therefore \overline{AB} // \overline{CD}$ (2)

, from (1) and (2) :

$\therefore$ ABCD is a parallelogram. (Q.E.D.)

5 $\because F \in \overrightarrow{AB}$

$\therefore m(\angle ABC) = 180° - 60° = 120°$

, $\because$ ABCD is a parallelogram

$\therefore m(\angle D) = m(\angle ABC) = 120°$ (First req.)

, $AD = BC = 5$ cm. (Second req.)

6 $\because M \in \overline{AC}$

$\therefore m(\angle BMC) = 180° - 70° = 110°$

$\therefore$ in Δ MBC :

$m(\angle BCM) = 180° - (110° + 40°) = 30°$

$\therefore m(\angle BCM) = m(\angle CAD)$

and they are alternate angles

$\therefore \overline{AD} // \overline{BC}$

, $\because \overline{AB} // \overline{DC}$

$\therefore$ ABCD is a parallelogram. (Q.E.D.)

7 $\because \overline{AD} // \overline{BC}$ (Two opposite sides in the square)

, $E \in \overline{BC}$ $\therefore \overline{AD} // \overline{CE}$

, $\because \overline{AC} // \overline{DE}$ (Given)

$\therefore$ ACED is a parallelogram. (Q.E.D.)

8 $\because$ ABCD is a square and $\overline{BD}$ is a diagonal in it.

$\therefore m(\angle BDC) = 45°$, $m(\angle C) = 90°$

$\therefore$ From the quadrilateral DEFC

$m(\angle EFC) = 360° - (45° + 90° + 102°) = 123°$

$\therefore y = 123°$, $\because F \in \overline{BC}$

$\therefore m(\angle AFB) = 180° - 123° = 57°$

$\therefore$ In Δ ABF which is right-angled at B

$m(\angle BAF) = 180° - (90° + 57°) = 33°$

$\therefore x = 33°$ (The req.)

9 $\because \overrightarrow{BD} // \overline{CA}$, $\overleftrightarrow{AB}$ is a transversal to them.

$\therefore m(\angle A) = m(\angle ABD) = 75°$ (Alternate angles)

$\therefore$ In Δ ABC :

$m(\angle ABC) = 180° - (75° + 45°) = 60°$

(The req.)

10 $\because \overrightarrow{ED} // \overrightarrow{BC}$, $\overleftrightarrow{EC}$ is a transversal to them.

$\therefore m(\angle C) + m(\angle E) = 180°$

(Two interior angles in the same side of the transversal)

$\therefore m(\angle C) = 180° - 100° = 80°$

, $\because \angle BAE$ is an exterior angle of ΔABC

$\therefore m(\angle BAE) = 40° + 80° = 120°$ (The req.)

---

11 $\because \overleftrightarrow{AB} // \overleftrightarrow{MN}$, $\overleftrightarrow{LM}$ is a transversal to them

$\therefore m(\angle M) = m(\angle ALM) = 70°$

(Alternate angles)

, $\because \overleftrightarrow{AB} // \overleftrightarrow{MN}$, $\overleftrightarrow{LN}$ is a transversal to them

$\therefore m(\angle N) = m(\angle BLN) = 50°$

(Alternate angles)

In ΔLMN :

$\therefore m(\angle MLN) = 180° - (70° + 50°) = 60°$

(The req.)

---

12 $\because \overrightarrow{EF} // \overrightarrow{BC}$, $\overleftrightarrow{BE}$ is a transversal to them

$\therefore m(\angle B) = m(\angle E) = 50°$ (Alternate angles)

$\therefore$ In ΔABC :

$m(\angle BAC) = 180° - (30° + 50°) = 100°$

(The req.)

---

13 $\because \overrightarrow{FG} // \overrightarrow{BC}$, $\overleftrightarrow{BF}$ is a transversal to them

$\therefore m(\angle B) + m(\angle F) = 180°$

(Two interior angles in the same side of the transversal)

$\therefore m(\angle B) = 180° - 135° = 45°$

, $\because \overrightarrow{DE} // \overrightarrow{BC}$, $\overleftrightarrow{DC}$ is a transversal to them

$\therefore m(\angle C) + m(\angle D) = 180°$

(Two interior angles in the same side of the transversal)

$\therefore m(\angle C) = 180° - 120° = 60°$

$\therefore$ In ΔABC :

$m(\angle BAC) = 180° - (45° + 60°) = 75°$ (The req.)

---

14 $\because \overrightarrow{DE} // \overrightarrow{BC}$, $\overleftrightarrow{DB}$ is a transversal to them

$\therefore m(\angle B) = m(\angle D) = 60°$ (Alternate angles)

, $\because \overrightarrow{AY} \cap \overrightarrow{BX} = \{C\}$

$\therefore m(\angle ACB) = m(\angle XCY) = 40°$ (V.O.A.)

$\therefore$ In ΔABC :

$m(\angle BAC) = 180° - (40° + 60°) = 80°$ (The req.)

---

15 $\because \overrightarrow{AB} // \overrightarrow{DC}$, $\overleftrightarrow{BD}$ is a transversal to them.

$\therefore m(\angle B) + m(\angle D) = 180°$

(Two interior angles in the same side of the transversal)

$\therefore m(\angle B) = 180° - 120° = 60°$

, $\because \overrightarrow{AB} // \overrightarrow{EF}$, $\overleftrightarrow{AE}$ is a transversal to them.

$\therefore m(\angle A) + m(\angle E) = 180°$

(Two interior angles in the same side of the transversal)

$\therefore m(\angle A) = 180° - 110° = 70°$

$\therefore$ In ΔBHA :

$m(\angle BHA) = 180° - (60° + 70°) = 50°$

$\therefore m(\angle EHD) = m(\angle BHA)$

$= 50°$ (V.O.A) (The req.)

---

16 In ΔABC :

$\because$ X is the midpoint of $\overline{AB}$, $\overline{XY} // \overline{BC}$

$\therefore XY = \frac{1}{2} BC$

$\therefore BC = 2 \times 3 = 6$ cm. (First req.)

, Y is the midpoint of $\overline{AC}$

$\therefore AY = \frac{1}{2} \times 8 = 4$ cm. (Second req.)

---

17 In ΔABC :

$\because$ D and F are the midpoints of $\overline{AB}$ and $\overline{BC}$

$\therefore \overline{DF} // \overline{AC}$ (First req.)

$\therefore m(\angle BDF) = m(\angle A) = 48°$

(corresponding angles) (second req.)

---

18 $\because \Delta ABC$ is an equilateral triangle

$\therefore AB = AC = BC = 8$ cm.

, $\because$ X is the midpoint of $\overline{AB}$ and Y is the midpoint of $\overline{AC}$

$\therefore XY = \frac{1}{2} BC = \frac{1}{2} \times 8 = 4$ cm. (1)

, $\because$ Y is the midpoint of $\overline{AC}$ and Z is the midpoint of $\overline{BC}$

$\therefore YZ = \frac{1}{2} AB = \frac{1}{2} \times 8 = 4$ cm. (2)

, $\because$ X is the midpoint of $\overline{AB}$ and Z is the midpoint of $\overline{BC}$

$\therefore XZ = \frac{1}{2} AC = \frac{1}{2} \times 8 = 4$ cm. (3)

From (1) , (2) and (3) :

$\therefore$ The perimeter of $\Delta XYZ = 4 + 4 + 4 = 12$ cm.

(The req.)

---

19 $\because$ D is the midpoint of $\overline{AB}$

$\therefore AD = \frac{1}{2} \times 5 = 2.5$ cm. (1)

, $\because$ E is the midpoint of $\overline{AC}$

$\therefore AE = \frac{1}{2} \times 6 = 3$ cm. (2)

, in ΔABC :

$\because$ D is the midpoint of $\overline{AB}$ and E is the midpoint of $\overline{AC}$

$\therefore DE = \frac{1}{2} BC = \frac{1}{2} \times 7 = 3.5$ cm. (3)

From (1) , (2) and (3) :

$\therefore$ The perimeter of ADE $= 2.5 + 3 + 3.5 = 9$ cm.

(The req.)

---

20 In ΔABC :

$\because$ D is the midpoint of $\overline{AB}$

$\therefore AD = \frac{1}{2} \times 12 = 6$ cm. (1)

, $\because$ D is the midpoint of $\overline{AB}$ and $\overline{DE} \parallel \overline{BC}$

$\therefore$ E is the midpoint of $\overline{AC}$

$AE = \frac{1}{2} \times 8 = 4$ cm. (2)

, $DE = \frac{1}{2} BC = \frac{1}{2} \times 10 = 5$ cm. (3)

From (1) , (2) and (3) :

$\therefore$ The perimeter of $\Delta ADE = 6 + 4 + 5 = 15$ cm.

(The req.)

---

21 In ΔABC :

$\because$ D is the midpoint of $\overline{AB}$ and F is the midpoint of $\overline{AC}$

$\therefore DF = \frac{1}{2} BC = \frac{1}{2} \times 12 = 6$ cm. (1)

, $\because$ D is the midpoint of $\overline{AB}$ and E is the midpoint of $\overline{BC}$

$\therefore DE = \frac{1}{2} AC = \frac{1}{2} \times 8 = 4$ cm. (2)

, $\because$ E is the midpoint of $\overline{BC}$ and F is the midpoint of $\overline{AC}$

$\therefore EF = \frac{1}{2} AB = \frac{1}{2} \times 10 = 5$ cm. (3)

From (1) , (2) and (3) :

$\therefore$ The perimeter of $\Delta DEF = 6 + 4 + 5 = 15$ cm.

(The req.)

---

22 In ΔABC :

$\because$ D is the midpoint of $\overline{AB}$ and F is the midpoint of $\overline{AC}$

$\therefore BC = 2\,DF = 2 \times 5 = 10$ cm. (1)

, $\because$ D is the midpoint of $\overline{AB}$ and E is the midpoint of $\overline{BC}$

$\therefore AC = 2\,DE = 2 \times 7 = 14$ cm. (2)

, $\because$ E is the midpoint of $\overline{BC}$ and F is the midpoint of $\overline{AC}$ (3)

$\therefore AB = 2\,EF = 2 \times 6 = 12$ cm.

From (1) , (2) and (3) :

$\therefore$ The perimeter of $\Delta ABC = 10 + 14 + 12$

$= 36$ cm. (The req.)

Model 1

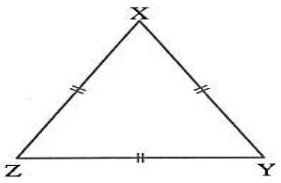
Total Mark 5

1 Choose the correct answer from the given ones : **(3 Marks)**

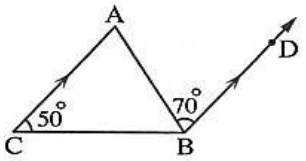
1 The two diagonals are equal in length and perpendicular in .....
(a) rhombus. (b) rectangle. (c) square. (d) parallelogram.

2 In ΔABC , $m(\angle A) = 2x^\circ$, $m(\angle B) = x^\circ$, $m(\angle C) = 3x^\circ$, then ΔABC is .....
(a) acute-angled triangle. (b) obtuse-angled triangle.
(c) right-angled triangle. (d) equilateral triangle.

3 **In the opposite figure :**
If XYZ is an equilateral triangle , then $m(\angle Y)$ = ...
(a) 108° (b) 180°
(c) 120° (d) 60°



2 In the opposite figure : **(2 Marks)**
$\overrightarrow{BD} \parallel \overline{CA}$, $m(\angle C) = 50°$
, $m(\angle ABD) = 70°$
Find : $m(\angle ABC)$



Model 2

Total Mark 5

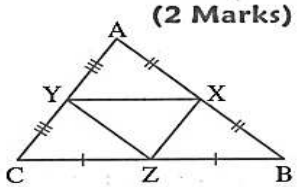
1 Choose the correct answer from the given ones : **(3 Marks)**

1 The diagonal of the square make an angle of measure ..... with any of its sides.
(a) 45° (b) 60° (c) 90° (d) 120°

2 ABCD is a parallelogram in which $m(\angle A) = 50°$, then $m(\angle B)$ = ...
(a) 50° (b) 130° (c) 180° (d) 90°

3 The sum of measures of the interior angles of a triangle equals .....
(a) 180° (b) 360° (c) 90° (d) 270°

2 In the opposite figure : **(2 Marks)**
ABC is a triangle in which :
X , Y , Z are the midpoints of $\overline{AB}$, $\overline{AC}$, $\overline{BC}$ respectively
Prove that : The perimeter of $\Delta XYZ = \frac{1}{2}$ the perimeter of ΔABC



Lesson [4] : Scientific Notation Of The Rational Numbers

• **Before explaining how to write the numbers in their scientific notation , we should notice the following :**

1 $10 = 10^1$, $100 = 10 \times 10 = 10^2$, $1000 = 10 \times 10 \times 10 = 10^3$ and so on

Hence we find that :

$2000 = 2 \times 1000 = 2 \times 10^3$, $50\,000 = 5 \times 10\,000 = 5 \times 10^4$

2 $0.1 = \frac{1}{10} = 10^{-1}$, $0.01 = \frac{1}{100} = \frac{1}{10 \times 10} = 10^{-2}$,

$0.001 = \frac{1}{1\,000} = \frac{1}{10 \times 10 \times 10} = 10^{-3}$ and so on

The standard scientific notation of a number :

The number is written in the standard form as : $a \times 10^n$ where $1 \leq |a| < 10$ and $n \in \mathbb{Z}$

In the following , there are examples for some numbers written in its standard form :

- 4.6×10^8
- 5.236×10^{-6}
- -9.6×10^{10}
- -1.001×10^{-5}
- -3×10^{12}
- 1×10^{-7}

Remark

- Notice that the number 32.4×10^5 is not in the standard form because $32.4 > 10$ and to write it in the standard form , we move the decimal point one place towards left and multiply by 10

  i.e. $32.4 \times 10^5 = 3.24 \times 10^5 \times 10 = 3.24 \times 10^6$ (the standard form)

- Notice that the number 0.032×10^{-4} is not in the standard form because $0.032 < 1$ and to write it in the standard form , we move the decimal point two places towards right and multiply by 10^{-2}

  i.e. $0.032 \times 10^{-4} = 3.2 \times 10^{-4} \times 10^{-2} = 3.2 \times 10^{-6}$ (the standard form)

- Notice that the standard form of the number 1 is 1×10^0 ,
  also the number 2 is 2×10^0 , and so on ...

Example 1 **Write each of the following numbers in the standard form :**

1 45×10^8 | **2** 706.4×10^5

Solution

1 $45 \times 10^8 = 4.5 \times 10^8 \times 10 = 4.5 \times 10^9$

2 $706.4 \times 10^5 = 7.064 \times 10^5 \times 10^2 = 7.064 \times 10^7$

Exercises

[A] : Choose The Correct Answer : -

1	The number which in the standard form between the following numbers is ..... (a) 11×10^8 (b) 9.7×10^{-5} (c) 10.3×10^{-3} (d) 0.87×10^8
2	Half of 2^{10} = ... (a) 2^9 (b) 2^5 (c) 1^{10} (d) 1^5
3	If the number 1.7×10^{10} is written in full form , how many zeroes follow the 7 ? (a) 9 (b) 10 (c) 11 (d) 12
4	$2^3 \times 2^3$ = ... (a) 2^6 (b) 2^8 (c) 2^{15} (d) 2^{53}
5	The value of 7 in the number 4375 is ..... (a) 0.7 (b) 7 (c) 70 (d) 700
6	Which of the following is the greatest ? (a) 33% (b) 0.5 (c) $\frac{1}{5}$ (d) 0.25
7	The standard form of quarter million is ..... (a) 0.25×10^6 (b) 0.25×10^4 (c) 2.5×10^5 (d) 25×10^4
8	The number 750000 is written in its scientific notation as 7.5×10^n , then n = ... (a) 4 (b) 5 (c) – 4 (d) – 5
9	$\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$, ... (In the same pattern) (a) $\frac{1}{5}$ (b) $\frac{8}{9}$ (c) $\frac{15}{16}$ (d) $\frac{20}{25}$
10	$50000 = 5 \times 10^n$, n = ... (a) 6 (b) 5 (c) 4 (d) 3
11	$3^x + 3^x + 3^x$ = ... (a) 3^x (b) 27^x (c) $3x^3$ (d) 3^{x+1}
12	$\left(-\frac{1}{3}\right)^{-1}$ = ... (a) $-\frac{1}{3}$ (b) 3 (c) – 3 (d) $\frac{1}{3}$
13	If $a^x = 4$ and $a^{-y} = 2$, then a^{x+y} = ... (a) $\frac{1}{2}$ (b) 8 (c) 4 (d) 2

14	$\left(\frac{2}{3}\right)^{-2}$ = ... (a) $\frac{4}{9}$ (b) $\frac{9}{4}$ (c) $\frac{-2}{3}$ (d) $\frac{-3}{2}$	
15	$16 \div 2 \times 3 - 9$ = ... (a) 2 (b) $\frac{16}{3}$ (c) 10 (d) 15	
16	$\left(\frac{4}{7}\right)^{0}$ = ... (a) 0 (b) 1 (c) $\frac{4}{7}$ (d) – 1	
17	The half of the number 2^{16} is ..... (a) 2^{8} (b) 1^{8} (c) 2^{6} (d) 2^{15}	
18	$(7)^{-2}$ = ... (a) 49 (b) $\frac{1}{49}$ (c) 14 (d) – 14	
19	$9 + 4 \times 3^{2}$ = ... (a) 45 (b) 117 (c) 24 (d) 33	
20	$500000 = 5 \times 10^{.....}$ (a) 3 (b) 4 (c) 2 (d) 5	
21	Quarter of 4^{20} equals ..... (a) 4^{5} (b) 4^{10} (c) 4^{19} (d) 1^{20}	
22	$3^{5} \times 2^{5}$ = ... (a) 5^{10} (b) 6^{10} (c) 6^{5} (d) 6^{25}	
23	The additive inverse of the number $(-3)^{3}$ is ..... (a) 27 (b) – 27 (c) 9 (d) – 9	
24	$6 \times 2 - 4 \div 2$ = ... (a) 1 (b) 2 (c) 10 (d) 12	
25	7.35×10^{-4} = ... (a) 0.000735 (b) 0.00735 (c) 0.0735 (d) 7350	
26	$6 \div 3^{0}$ = ... (a) 2 (b) 3 (c) 0 (d) 6	
27	$(3^{-2})^{-2}$ = ... (a) 3^{4} (b) 3^{-4} (c) 3^{2} (d) 3^{-2}	

[B] : Complete the Following : -

1	$0.00037 = 3.7 \times 10^{n}$, then n = ...
2	The number 420×10^{4} in the standard form is .....
3	The value of : $5\ [\ (2^2 - 1) - (2^2 - 3)\ ] =$ .....
4	$\frac{1}{9}$, $\frac{1}{8}$, $\frac{1}{7}$, ... , ... (In the same pattern).
5	$\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$, $\frac{15}{16}$, ... , ... (In the same pattern)
6	1 , 1 , 2 , 3 , 5 , 8 , ... , ... (in its same pattern)
7	If $\frac{x}{y} = \frac{3}{2}$, then $\frac{2x}{5y} =$ ..... = ...
8	$2.37 \times 10^{-4} =$ .....
9	The value of : $5 \times 6 - 4 \div 2 =$ .....
10	The multiplicative inverse of $\left(\frac{-2}{3}\right)^2$ is .....
11	$(x - 2)^{zero} = 1$ if $x \neq$ .....
12	The additive inverse of 2^{-1} is .....
13	If $2^{x} = 3$, then $4^{x} =$ .....
14	0.75×10^{8} in the standard form is ..... × .....
15	$4 \times 7 - 3^2 =$ .....
16	$2^2 \times 2 = 2^{\ldots\ldots} =$ .....
17	If $x = y$, then $5^{x-y} =$ .....

18	$\left(\frac{2}{7}\right)^5 \div \left(\frac{2}{7}\right)^3 =$ .....
19	If $\frac{x}{y} = \frac{7}{2}$, then $\frac{2x}{7y} =$ .....
20	The standard form of the number $0.7 \times 0.0005 =$ .....
21	$4 \times 2^3 - 20 =$ .....
22	The additive inverse for $\left(\frac{2}{-3}\right)^{-3}$ is .....
23	3 , 5 , 7 , 9 , ... (in the same pattern)
24	If $a = b$, then $7^{b-a} =$ .....
25	The additive inverse of $(-1)^3 =$ .....
26	If $A = 0.000625$, then $\sqrt{A} = 2.5 \times 10^{.....}$
27	The standard form of the number $0.7 \times 0.005 =$ .....
28	$4^2 \div 2 \times 3 - 9 =$ .....
29	$\left(\frac{-2}{3}\right)^{-3} =$ .....
30	$(3a^2)^{-1} = \frac{1}{.....}$
31	If $\frac{x}{y} = \frac{3}{2}$, then $\frac{2x}{3y} =$ .....
32	If $\left(\frac{5}{6}\right)^n = \frac{25}{36}$, then $n =$ .....
33	The term whose order is 50^{th} in the pattern $\left(\frac{1}{2} , \frac{2}{3} , \frac{3}{4} , \frac{4}{5} , ...\right)$ is .....
34	The standard form of 0.000057 = ...
35	$3 \times 4 - 21 \div 7 =$ .....

[C] : Essay Problems : -

1	**Write the standard form of :** 0.00075 2016 Exam (1) Question (5) (a)
2	**Find the result of the following in the standard form :** $(4.4 \times 10^5) \div (2 \times 10^3)$ 2018 Exam (5) Question (3) (b)
3	**Find the value of :** $\dfrac{3^2 \times 6 \div 3}{2 \times 1 + (3+1)^2}$ 2017 Exam (10) Question (3) (b)
4	If $x = \dfrac{-1}{2}$ and $y = \dfrac{3}{4}$, **find in the simplest form the value of :** (1) $x^3 y$ (2) $(x-y)^{-1}$ 2016 Exam (5) Question (4) (a)
5	If $x = \dfrac{1}{2}$, $y = \dfrac{4}{5}$ and $z = \dfrac{5}{2}$, then find : $x^2 y z$ 2016 Exam (2) Question (5) (a)
6	**Simplify (with steps) :** $4^2 \div 2 \times 3 - 9$ 2016 Exam (5) Question (3) (mm)
7	**Find :** [a] $\dfrac{4}{9} \times 11 + \dfrac{4}{9} \times 15 + \dfrac{4}{9}$ 2018 Exam (13) Question (5) (a)
8	If $x = -\dfrac{1}{2}$, $y = -\dfrac{3}{4}$, **find in the simplest form :** $\left(\dfrac{y}{x^2}\right)^{-2}$ Model 2018 Exam (2) Question (5) (b)
9	If $x = 2$, $y = \dfrac{1}{2}$ and $z = -2$ **find the value of :** $(x y)^5 + z^2$ 2016 Exam (14) Question (5) (a)
10	**Simplify :** $2^3 + [\, 4 + (2^2 \div 4)\,]$ 2017 Exam (14) Question (5) (a)
11	**Find :** $30 \div 6 \times 8 - (3 - 1)$ 2018 Exam (2) Question (4) (b)
12	**Evaluate :** $16\,t \div (4\,s) + 3\,s\,t$ for $t = 9$ and $s = 6$ 2017 Exam (15) Question (4) (b)
13	If $x = 2$, $y = \dfrac{1}{2}$ and $z = \dfrac{2}{3}$ **Find the result of :** $(x y)^3 + 9 z^2$ 2016 Exam (10) Question (5) (b)
14	**Find the numerical value of the expression :** $3\,ab + 8\,a \div (4b)$ when $a = 4$, $b = -2$ Model 2018 Exam (1) Question (3) (b)

15	**Find the result in the simplest form :** $2 \times 6 - 4 \div 2$ 2018 Exam (15) Question (3) (a)
16	**Find the value of :** $12 \times (2)^2 \div 24 + 3^2$ 2018 Exam (12) Question (4) (b)
17	**Evaluate :** $\frac{16\,x}{4\,y} + 4\,x\,y$ for $x = 9$ and $y = 6$ 2017 Exam (12) Question (4) (a)
18	If $x = \frac{3}{4}$, $y = \frac{1}{3}$, **then find the value of :** $(x^2\,y^2)^{-3}$ 2018 Exam (5) Question (5) (a)
19	**Calculate :** $2\,[\,(5^2 + 1) - (4^2 - 1)\,]$ 2017 Exam (14) Question (3) (b)
20	**Find the value of expression :** $12 \times (2)^2 \div 24 + (-3)^2$ 2017 Exam (9) Question (4) (b)
21	If $t = 9$ and $s = 6$ **find the value of :** $16\,t - 4\,s + 3$ 2017 Exam (4) Question (4) (b)
22	If $x = \frac{3}{4}$, $y = \frac{-3}{2}$, **then find the numerical value of :** $\left(\frac{x}{y}\right)^2$ 2018 Exam (4) Question (3) (a)
23	**Simplify :** $\frac{1}{2}(4\,n - 2) + \frac{1}{3}(3 + 9\,n)$, then find its value when $n = 1$ 2017 Exam (8) Question (4) (a)
24	**Simplify :** $2 - [(7 - 3) - 2]$ 2016 Exam (15) Question (5) (a)
25	**Without using calculator find the value of :** $[(11) - (-10)] + 2 \times (-6)$ 2017 Exam (3) Question (3) (a)
26	If $x = 9$ and $y = 6$, **then find the numerical value of :** $16\,x \div (4\,y) + 3\,x\,y$ 2017 Exam (3) Question (3) (b)
27	If $x = \frac{3}{4}$ and $y = -\frac{3}{2}$, then find the numericla value of : $(x^2 \div y^3)^2$ 2016 Exam (11) Question (5) (a)
28	**Simplify :** $\frac{n}{2}(3\,n - 6) + \frac{1}{3}(3 + 9\,n)$, then find its value when $n = 1$ 2016 Exam (8) Question (5) (a)
29	**Use the rules of order of operations to find the result of :** $2 + 5^3 \div 5$ 2016 Exam (10) Question (3) (a)
30	**Find the value of :** $10 \times 4 - (2 \times 6 - 8)$ in its simplest form 2018 Exam (14) Question (4) (b)

Homework

[A] : Choose The Correct Answer : -

1	The number which in the standard form between the following numbers is				
	(a) 11×10^8	(b) 9.7×10^{-5}	(c) 10.3×10^{-3}	(d) 0.87×10^8	
2	$6 \times 2 - 4 \div 2 =$				
	(a) 1	(b) 2	(c) 10	(d) 12	
3	$\frac{9}{20} =$ ..... %				
	(a) 9	(b) 18	(c) 27	(d) 45	
4	$\left(\frac{-2}{3}\right)^{-3}$ equals				
	(a) $\frac{-27}{8}$	(b) $\frac{-8}{27}$	(c) $\frac{8}{27}$	(d) $\frac{27}{8}$	
5	$500000 = 5 \times 10^{.....}$				
	(a) 3	(b) 4	(c) 2	(d) 5	
6	$3^{10} + 3^{10} + 3^{10} =$				
	(a) 3^{10}	(b) 3^{11}	(c) 3^{20}	(d) 3^{30}	
7	$3 + 3 + 3 =$				
	(a) 3^0	(b) 3^1	(c) 3^2	(d) 3^3	
8	$9 + 4 \times 3^2 =$				
	(a) 45	(b) 117	(c) 24	(d) 33	
9	If $x = y$, then $5^{x-y} =$				
	(a) 5	(b) 1	(c) 0	(d) – 1	
10	If $x = y$, then $\left(\frac{3}{5}\right)^{x-y} =$				
	(a) 0	(b) 1	(c) $\frac{3}{5}$	(d) $\frac{5}{3}$	
11	$16 \div 2 \times 3 - 9 =$				
	(a) 2	(b) $\frac{16}{3}$	(c) 10	(d) 15	
12	Which of the following is the greatest ?				
	(a) 2.3×10^4	(b) 2.3×10^5	(c) 3.2×10^4	(d) 3.2×10^5	

13	The multiplicative inverse of $(-1)^2$ ..... (a) -1 (b) -2 (c) 2 (d) 1	
14	$50000 = 5 \times 10^n$, n = ... (a) 6 (b) 5 (c) 4 (d) 3	
15	$5 \times 4 - 8 \div 2$ = ... (a) 16 (b) 6 (c) 14 (d) 18	
16	$(4)^{-1}$ = ... (a) $-\frac{1}{4}$ (b) $\frac{1}{4}$ (c) 4 (d) -4	
17	The number 750000 is written in its scientific notation as 7.5×10^n , then n = ... (a) 4 (b) 5 (c) -4 (d) -5	
18	If $x = \frac{1}{2}$ and $y = \frac{-1}{4}$, then $(x-y)^{-1}$ = ... (a) $\frac{1}{2}$ (b) 2 (c) 4 (d) $\frac{4}{3}$	
19	$2 \times 6 - 4 \times 2$ = ... (a) 4 (b) 8 (c) 10 (d) 2	
20	The standard form of quarter million is ..... (a) 0.25×10^6 (b) 0.25×10^4 (c) 2.5×10^5 (d) 25×10^4	
21	0.354×100 = ... (a) 3.54 (b) 35.4 (c) 354 (d) 3540	
22	If the number 1.7×10^{10} is written in full form , how many zeroes follow the 7 ? (a) 9 (b) 10 (c) 11 (d) 12	
23	$6 \div 3^0$ = ... (a) 2 (b) 3 (c) 0 (d) 6	
24	Which of the following is the smallest number ? (a) 314×10^3 (b) 3.14×10^4 (c) 31.4×10^5 (d) 0.314×10^8	
25	$2 \times 6 - 4 \div 2$ = ... (a) 10 (b) 4 (c) 2 (d) 1	
26	7.35×10^{-4} = ... (a) 0.000735 (b) 0.00735 (c) 0.0735 (d) 7350	
27	$3 \times 6 - 4 \div 2$ = ... (a) 3 (b) 7 (c) 16 (d) 20	

[B] : Complete the Following : -

1	$0.00037 = 3.7 \times 10^{n}$, then n = ...
2	$4 \times 2^{3} - 20$ = ...
3	$3 \times 4 - 4 \div 2$ = ...
4	$\left(\frac{1}{5}\right)^{-1}$ = ...
5	$\left(\frac{-2}{3}\right)^{-3}$ = ...
6	The standard form of the number 0.7×0.0005 = ...
7	0.00037 in scientific notation = ...
8	$25 \div (4 + 1)$ = ...
9	Quarter of 4^{20} equals $4^{.....}$
10	$4 \times 7 - 3^{2}$ = ...
11	$196 \div (7 - 5)^{2}$ = ...
12	$2 \times 6 - 4 \div 2$ = ...
13	$5\,x^{0}$ = ...
14	0.75×10^{8} in the standard form is ..... × .....
15	$3 \times 4 - 21 \div 7$ = ...
16	✱ If $0.0006 = 6 \times 10^{n}$, then n = ...
17	$(b^{-1})^{-3} = b^{.....}$
18	The value of : $5 \times 6 - 4 \div 2$ = ...

19	The standard form of 0.000057 = ...
20	$459.799 \approx$ ..... to the nearest tenth
21	$7\,(6^2 - 5 \times 6)$ = ...
22	2.37×10^{-4} = ...
23	The term whose order is 50^{th} in the pattern $\left(\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \ldots\right)$ is .....
24	The multiplicative inverse of 7 = ...
25	If $5000 = 5 \times 10^n$, then n = ...
26	The value of : $5\,[\,(2^2 - 1) - (2^2 - 3)\,]$ = ...
27	$4^2 \div 2 \times 3 - 9$ = ...
28	If $x = \frac{1}{2}$, $y = \frac{1}{4}$, then $(x + y)^{-1}$ .....
29	(1 , 2 , 3 , 5 , 8 , 13 , ... , ... (in the same pattern)
30	The number 420×10^4 in the standard form is .....
31	The standard form of the number 0.7×0.005 = ...
32	$\frac{1}{9}$, $\frac{1}{8}$, $\frac{1}{7}$, ... , ... (In the same pattern).
33	$\frac{a^2}{b^2} \times \left(\frac{b}{c}\right)^2$ = ... in the simplest form where $b \neq 0$ and $c \neq 0$
34	If $A = 0.000625$, then $\sqrt{A} = 2.5 \times 10$ .....
35	$28 \div 4 + 3 - 2 \times 5$ = ...
36	The additive inverse of $\left(\frac{\sqrt{2}}{3}\right)^0$ = ...

[C] : Essay Problems : -

1	**Find the value of :** $12 \times (2)^2 \div 24 + 3^2$ 2018 Exam (12) Question (4) (b)
2	**Simplify :** $2 - [(7 - 3) - 2]$ 2016 Exam (15) Question (5) (a)
3	**Simplify :** $n(n-2) + 2(n+1)$, then find the numerical value of the result when $(n = -1)$ 2016 Exam (7) Question (5) (a)
4	If $x = \frac{1}{2}$, $y = \frac{-3}{2}$, $z = \frac{3}{4}$ **Find the value of :** $\left(\frac{x+y}{z}\right)^{-2}$ 2018 Exam (3) Question (4) (b)
5	**Simplify :** $\frac{1}{2}(4n - 2) + \frac{1}{3}(3 + 9n)$, then find its value when $n = 1$ 2017 Exam (8) Question (4) (a)
6	If $x = \frac{-3}{2}$, $y = \frac{-4}{3}$, find in the simplest form $\left(\frac{x}{y}\right)^2$ 2016 Exam (9) Question (3) (a)
7	If $a = \frac{-1}{3}$ and $b = \frac{2}{3}$, find the numerical value of $\frac{a^2}{b^3}$ 2016 Exam (6) Question (4) (b)
8	If $x = \frac{3}{4}$, $y = \frac{-3}{2}$, **then find the numerical value of :** $\left(\frac{x}{y}\right)^2$ 2018 Exam (4) Question (3) (a)
9	**Find the numerical value of the expression :** $3ab + 8a \div (4b)$ when $a = 4$, $b = -2$ Model 2018 Exam (1) Question (3) (b)
10	**Evaluate the numerical value of following expressions when $t = 2$, $a = 5$:** (1) $\frac{a - t}{a^3}$ (2) $\frac{6^2}{a - 1}$ 2018 Exam (1) Question (4) (a)
11	If $t = 9$ and $s = 6$ **find the value of :** $16t - 4s + 3$ 2017 Exam (4) Question (4) (b)
12	**Find the value of :** $10 \times 4 - (2 \times 6 - 8)$ in its simplest form 2018 Exam (14) Question (4) (b)
13	**Calculate the value :** $(7 - 4) \times 2 \div (5 - 3)$ 2017 Exam (1) Question (3) (b)
14	**Find the value of expression :** $12 \times (2)^2 \div 24 + (-3)^2$ 2017 Exam (9) Question (4) (b)

15	**Use the rules of order of operations to find the result of :** $2 + 5^3 \div 5$ 2016 Exam (10) Question (3) (a)
16	If $x = \frac{-3}{2}$, $y = \frac{1}{2}$ and $z = \frac{-4}{3}$, then find the numerical value of the following in the simplest form : $x^2 - y\,z^2$ 2016 Exam (15) Question (3) (b)
17	**Calculate :** $2\,[\,(5^2 + 1) - (4^2 - 1)\,]$ 2017 Exam (14) Question (3) (b)
18	**Simplify :** $\frac{n}{2}(3n - 6) + \frac{1}{3}(3 + 9n)$, then find its value when $n = 1$ 2016 Exam (8) Question (5) (a)
19	If $x = \frac{2}{5}$, $y = \frac{-2}{5}$ **Find the numerical value of :** $\left(\frac{x^2}{y^3}\right)^2$ 2016 Exam (8) Question (4) (b)
20	If $x = \frac{3}{4}$, $y = \frac{1}{3}$, **then find the value of :** $(x^2\,y^2)^{-3}$ 2018 Exam (5) Question (5) (a)
21	If $x = \frac{3}{4}$ and $y = -\frac{3}{2}$, then find the numericla value of : $(x^2 \div y^3)^2$ 2016 Exam (11) Question (5) (a)
22	If $x = 3$ and $y = 2$, **then find the numerical value of :** $16\,x \div (4\,y) + 3\,x\,y$ 2018 Exam (6) Question (3) (a)
23	**Evaluate :** $\frac{16\,x}{4\,y} + 4\,x\,y$ for $x = 9$ and $y = 6$ 2017 Exam (12) Question (4) (a)
24	If $x = 9$ and $y = 6$, **then find the numerical value of :** $16\,x \div (4\,y) + 3\,x\,y$ 2017 Exam (3) Question (3) (b)
25	**Find the value by using the order operation :** $8 \times 2^2 - 7 \times (4 + 1)$ 2017 Exam (5) Question (5) (b)
26	**Without using calculator find the value of :** $[(11) - (-10)] + 2 \times (-6)$ 2017 Exam (3) Question (3) (a)
27	**Write the following numbers in the standard form :** (1) 7 millions (2) 0.0006 2016 Exam (9) Question (4) (a)

Lesson [6] : The Square Root

Definition :

The square root of the perfect square rational number «a» is the number whose square equals «a».

For example:

- The number 6 is a square root of the number 36 **because :** $6^2 = 36$
- Also , the number (-6) is a square root of the number 36 **because :** $(-6)^2 = 36$

Generally

- The positive square root of the number a is symbolized by $\sqrt{a}$

  For example:

  The positive square root of 25 is $\sqrt{25} = 5$
- The negative square root of the number a is symbolized by $-\sqrt{a}$

  For example:

  The negative square root of 16 is $-\sqrt{16} = -4$
- The two square roots of the number a is symbolized by $\pm\sqrt{a}$ which means $\sqrt{a}$, $-\sqrt{a}$, and each of them is the additive inverse of the other.

  For example:

  The two square roots of 49 are $\pm\sqrt{49} = \pm 7$

Remarks

1. $\sqrt{0} = 0$
2. It is meaningless to find $\sqrt{a}$ if a is a negative rational number because there is no rational number if it is multiplied by itself , the result will be negative.
3. $\sqrt{a^2} = |a|$

   For example:

   - $\sqrt{(-3)^2} = |-3| = 3$
   - $\sqrt{(-\frac{4}{5})^2} = |-\frac{4}{5}| = \frac{4}{5}$
4. $\sqrt{a^2 b^2} = \sqrt{(ab)^2} = |ab|$

   For example:

   $\sqrt{a^4 b^6} = \sqrt{(a^2 b^3)^2} = |a^2 b^3|$
5. If $x^2 = a$ where $a \geq 0$, then $x = \pm\sqrt{a}$

Exercises

[A] : Choose The Correct Answer : -

1	The square roots of 36 = ...				
	(a) 6	(b) – 6	(c) ± 6	(d) 18	
2	$\sqrt{\frac{9}{49}}$ = ...				
	(a) $\frac{2}{3}$	(b) $\frac{3}{7}$	(c) $\frac{1}{2}$	(d) 0.1	
3	$\sqrt{16}$ = ...				
	(a) 4	(b) ± 4	(c) 8	(d) ± 8	
4	$\sqrt{\frac{25}{49}}$ = ...				
	(a) $\frac{5}{7}$	(b) $\frac{-5}{7}$	(c) $\pm\frac{5}{7}$	(d) $\frac{7}{5}$	
5	$\sqrt{\frac{4}{49}}$ = ...				
	(a) $\frac{2}{7}$	(b) $\frac{3}{7}$	(c) $\frac{4}{49}$	(d) $\frac{1}{9}$	
6	$\sqrt{\frac{4}{9}}$ = ...				
	(a) $\frac{2}{3}$	(b) $\frac{3}{2}$	(c) $\frac{4}{9}$	(d) $\frac{9}{4}$	
7	$\sqrt{100-64}$ = ...				
	(a) ± 6	(b) 2	(c) $\lvert -6 \rvert$	(d) ± 2	
8	$\sqrt{9+16}$ = ...				
	(a) 7	(b) – 7	(c) 5	(d) – 5	
9	$\sqrt{64+36}$ = ...				
	(a) $\lvert -10 \rvert$	(b) ± 10	(c) 14	(d) – 14	
10	$\sqrt{(-5)^2}$ = ...				
	(a) 25	(b) 5	(c) – 5	(d) ± 5	
11	$\sqrt{x^8}$ = ...				
	(a) x^8	(b) x^5	(c) x^6	(d) x^4	
12	$\sqrt{\left(\frac{-5}{6}\right)^2}$ = ...				
	(a) $\frac{-5}{6}$	(b) $\frac{5}{6}$	(c) $\frac{25}{36}$	(d) meaningless	

13	$\sqrt{(-8)^2+(-6)^2}$ = ...				
	(a) $\lvert-10\rvert$	(b) ± 10	(c) 14	(d) -14	
14	$\sqrt{\sqrt{81}}$ = ...				
	(a) 81	(b) 27	(c) 9	(d) 3	
15	$\sqrt{100-(-6)^2}$ = ...				
	(a) 4	(b) 8	(c) 2	(d) 16	
16	$\sqrt{(-8)^2+(-6)^2}$ = ...				
	(a) $\lvert-10\rvert$	(b) ± 10	(c) 14	(d) -14	
17	The number $\sqrt{0.09}$ is				
	(a) natural.	(b) positive integer.	(c) negative integer.	(d) rational.	
18	$\sqrt{100-64}$ = 10 –				
	(a) 8	(b) 6	(c) 4	(d) 2	
19	$\sqrt{(-6)^2+(-8)^2}$ = 25 –				
	(a) 15	(b) 10	(c) 6	(d) 8	
20	$\sqrt{9}+\sqrt{4}=\sqrt{.....}$				
	(a) 13	(b) 5	(c) 25	(d) $\sqrt{13}$	
21	The multiplicative inverse of the number $\sqrt{\frac{9}{16}}$ is				
	(a) $\frac{-4}{3}$	(b) $\frac{-3}{4}$	(c) $\frac{3}{4}$	(d) $\frac{4}{3}$	
22	The multiplicative inverse of $\sqrt{\frac{10}{2.5}}$ is				
	(a) 2	(b) 4	(c) $\frac{1}{2}$	(d) $\frac{1}{4}$	
23	The multiplicative inverse of $\sqrt{\frac{100}{25}}$ is				
	(a) $\pm\frac{10}{5}$	(b) $\pm\frac{5}{10}$	(c) $\frac{10}{5}$	(d) $\frac{5}{10}$	
24	The multiplicative inverse of $\sqrt{\frac{4}{25}}$ in the simplest form is				
	(a) $\frac{25}{4}$	(b) $\sqrt{\frac{5}{2}}$	(c) $\frac{5}{2}$	(d) $\frac{2}{5}$	
25	The side length of a square whose area $9x^2$ cm.^{2} is ..... cm.				
	(a) $3x^2$	(b) $9x$	(c) $9x^2$	(d) $3x$	
26	The side length of a square whose area is $49x^2$ cm.^{2} is ..... cm.				
	(a) 7	(b) $7x$	(c) $\pm 7x$	(d) $7x^2$	

[B] : Complete the Following : -

1	$-\sqrt{4} =$ .....
2	$\sqrt{100-64} =$ .....
3	$\sqrt{16+9} = 4 +$ .....
4	If $a = 0.0009$, then $\sqrt{a} = 3 \times 10^{.....}$
5	The multiplicative inverse of the number $\sqrt{\frac{4}{25}}$ is .....
6	$\sqrt{25-9} =$ .....
7	$\sqrt{(10)^2-(8)^2} = 10 -$ .....
8	If $a = 0.000625$, then $\sqrt{a} =$ ..... in standard form.
9	The additive inverse of : $\sqrt{\frac{4}{9}} =$ .....
10	$\sqrt{\frac{9}{25}} =$ ..... %
11	$\sqrt{\sqrt{16}} =$ .....
12	$\sqrt{36} + \sqrt{16} = \sqrt{.....}$
13	The additive inverse of $\sqrt{\left(\frac{-2}{5}\right)^2}$ is .....
14	$\sqrt{1\frac{11}{25}} =$ .....
15	$\sqrt{(-8)^2+6^2} =$ .....
16	$\sqrt{49x^2} =$ .....

17	If $\frac{b}{8} = \frac{9}{2}$, then $\sqrt{b}$ = ...
18	$\sqrt{\frac{25x^2y^2}{36}}$ = ... (in the simplest form).
19	The additive inverse of the $\sqrt{\frac{4}{25}}$ is .....
20	$\sqrt{\frac{144}{169}}$ = ...
21	$\sqrt{6^2+8^2}$ = ...
22	$\sqrt{\frac{49a^4b^2}{9}}$ = ...
23	The additive inverse of the number $\sqrt{(-2)^2}$ is ..... .
24	If the area of a circle 49π cm^2 , then the radius length = ... cm.
25	$\sqrt{\frac{10}{2.5}}$ = ...
26	The value of $\sqrt{(6)^2+64}$ = ...
27	$\sqrt{25x^4}$ = ...
28	The additive inverse of the number $\sqrt{1\frac{9}{16}}$ is .....
29	The side length of a square whose area is $49x^2$ cm^2 is ..... cm.
30	$\sqrt{\frac{16}{49}}$ = ...
31	$\sqrt{\left(\frac{-4}{9}\right)^2}$ = ...

[C] : Essay Problems : -

1	**Find :** $\sqrt{\frac{49\,a^4\,b^2}{9}}$ 2017 Exam (3) Question (5) (a)
2	**Simplify :** $\left(\frac{-2}{5}\right)^2 \times \left(\frac{-3}{5}\right)^0 \times \sqrt{6\frac{1}{4}}$ 2016 Exam (3) Question (3) (a)
3	If $\frac{x}{27} = \frac{3}{x}$ Find the value of x 2018 Exam (10) Question (5) (b)
4	**Find the value of the expression in the simplest form :** $\frac{3}{4} \times \sqrt{\frac{81}{64}} \times \left(\frac{-2}{3}\right)^2$ 2016 Exam (6) Question (4) (a)
5	If $x = \frac{-2}{27}$, $y = \frac{-3}{2}$ **Find the numerical value of the expression :** $\sqrt{\frac{x}{y}}$ (in the simplest form). 2017 Exam (6) Question (3) (a)
6	**Simplify :** $\left(-\frac{3}{7}\right)^0 \times \left(-\frac{2}{5}\right)^2 \times \sqrt{6\frac{1}{4}}$ (Show steps) 2018 Exam (10) Question (4) (a)
7	**Find the value of the expression :** $\left(\frac{-1}{2}\right)^2 - \sqrt{0.25} + \left(\frac{-7}{9}\right)^0$ 2016 Exam (7) Question (4) (b)
8	**Find the value of the following :** $\left(\frac{-2}{3}\right)^{\text{zero}} \times \sqrt{\frac{16}{81}} \times \frac{3}{4}$ 2018 Exam (5) Question (4) (b)
9	**Find the value of :** $\sqrt{\left(\frac{-1}{9}\right)^2} + \sqrt{\frac{64}{81}} - \sqrt{\left(\frac{3}{7}\right)^0}$ 2017 Exam (1) Question (5) (a)
10	If $\frac{3}{4}$ of area of square = $1\frac{11}{64}\,m^2$. Find its perimeter. 2018 Exam (13) Question (3) (b)
11	**Find the result in the simplest form :** $\left(\frac{3}{4}\right)^{\text{zero}} \times \sqrt{\frac{81}{64}} \times \left(-\frac{2}{3}\right)^3$ 2016 Exam (2) Question (4) (a)
12	**Find the value of the expression in simplest form :** $\left(\frac{-1}{3}\right)^2 + \sqrt{\frac{64}{81}} - \left(\frac{3}{7}\right)^0$ 2017 Exam (12) Question (3) (a)

Homework

[A] : Choose The Correct Answer : -

1	The square roots of 36 = ... (a) 6 (b) – 6 (c) ± 6 (d) 18
2	$\sqrt{64+36}$ = ... (a) $\lvert -10 \rvert$ (b) ± 10 (c) 14 (d) – 14
3	$\sqrt{100-64}$ = 10 – ..... (a) 8 (b) 6 (c) 4 (d) 2
4	If $\sqrt{\frac{a}{b}} = \frac{2}{3}$, then $\frac{b}{a}$ = ... (a) $\frac{9}{4}$ (b) $\frac{3}{2}$ (c) $\frac{4}{9}$ (d) $\frac{2}{3}$
5	$\sqrt{9+16}$ = ... (a) 7 (b) – 7 (c) 5 (d) – 5
6	The number $\sqrt{0.09}$ is ..... (a) natural. (b) positive integer. (c) negative integer. (d) rational.
7	The side length of a square whose area is $49\,x^2$ cm.^{2} is ..... cm. (a) 7 (b) $7x$ (c) $\pm 7x$ (d) $7x^2$
8	$\sqrt{100-64}$ = ... (a) ± 6 (b) 2 (c) $\lvert -6 \rvert$ (d) ± 2
9	$\sqrt{(-8)^2+(-6)^2}$ = ... (a) $\lvert -10 \rvert$ (b) ± 10 (c) 14 (d) – 14
10	The side length of a square whose area $9\,x^2$ cm.^{2} is ..... cm. (a) $3x^2$ (b) $9x$ (c) $9x^2$ (d) $3x$
11	$\sqrt{\frac{4}{9}}$ = ... (a) $\frac{2}{3}$ (b) $\frac{3}{2}$ (c) $\frac{4}{9}$ (d) $\frac{9}{4}$
12	$\sqrt{100-(-6)^2}$ = ... (a) 4 (b) 8 (c) 2 (d) 16
13	The multiplicative inverse of $\sqrt{\frac{10}{2.5}}$ is ..... (a) 2 (b) 4 (c) $\frac{1}{2}$ (d) $\frac{1}{4}$

14 The multiplicative inverse of $\sqrt{\frac{4}{25}}$ in the simplest form is .....

(a) $\frac{25}{4}$ (b) $\sqrt{\frac{5}{2}}$ (c) $\frac{5}{2}$ (d) $\frac{2}{5}$

15 $\sqrt{\frac{4}{49}}$ = ...

(a) $\frac{2}{7}$ (b) $\frac{3}{7}$ (c) $\frac{4}{49}$ (d) $\frac{1}{9}$

16 $\sqrt{\sqrt{81}}$ = ...

(a) 81 (b) 27 (c) 9 (d) 3

17 The multiplicative inverse of $\sqrt{\frac{100}{25}}$ is .....

(a) $\pm\frac{10}{5}$ (b) $\pm\frac{5}{10}$ (c) $\frac{10}{5}$ (d) $\frac{5}{10}$

18 $\sqrt{\frac{25}{49}}$ = ...

(a) $\frac{5}{7}$ (b) $\frac{-5}{7}$ (c) $\pm\frac{5}{7}$ (d) $\frac{7}{5}$

19 $\sqrt{(-8)^2+(-6)^2}$ = ...

(a) $|-10|$ (b) ± 10 (c) 14 (d) -14

20 $\sqrt{16}$ = ...

(a) 4 (b) ± 4 (c) 8 (d) ± 8

21 $\sqrt{\left(\frac{-5}{6}\right)^2}$ = ...

(a) $\frac{-5}{6}$ (b) $\frac{5}{6}$ (c) $\frac{25}{36}$ (d) meaningless

22 The multiplicative inverse of the number $\sqrt{\frac{9}{16}}$ is .....

(a) $\frac{-4}{3}$ (b) $\frac{-3}{4}$ (c) $\frac{3}{4}$ (d) $\frac{4}{3}$

23 $\sqrt{\frac{9}{49}}$ = ...

(a) $\frac{2}{3}$ (b) $\frac{3}{7}$ (c) $\frac{1}{2}$ (d) 0.1

24 $\sqrt{x^8}$ = ...

(a) x^8 (b) x^5 (c) x^6 (d) x^4

25 $\sqrt{9}+\sqrt{4}=\sqrt{\ldots\ldots}$

(a) 13 (b) 5 (c) 25 (d) $\sqrt{13}$

26 $\sqrt{(-5)^2}$ = ...

(a) 25 (b) 5 (c) -5 (d) ± 5

[B] : Complete the Following : -

1	$-\sqrt{4} =$ .....
2	$\sqrt{100-64} =$ .....
3	$\sqrt{16+9} = 4 +$ .....
4	If $a = 0.0009$, then $\sqrt{a} = 3 \times 10^{.....}$
5	The multiplicative inverse of the number $\sqrt{\frac{4}{25}}$ is .....
6	$\sqrt{25-9} =$ .....
7	$\sqrt{(10)^2-(8)^2} = 10 -$ .....
8	If $a = 0.000625$, then $\sqrt{a} =$ ..... in standard form.
9	The additive inverse of : $\sqrt{\frac{4}{9}} =$ .....
10	$\sqrt{\frac{9}{25}} =$ ..... %
11	$\sqrt{\sqrt{16}} =$ .....
12	$\sqrt{36} + \sqrt{16} = \sqrt{.....}$
13	The additive inverse of $\sqrt{\left(\frac{-2}{5}\right)^2}$ is .....
14	$\sqrt{1\frac{11}{25}} =$ .....
15	$\sqrt{(-8)^2+6^2} =$ .....
16	The additive inverse of the number $\sqrt{(-2)^2}$ is .....

17	If the area of a circle 49π cm^2 , then the radius length = ... cm.
18	$\sqrt{\frac{25x^2y^2}{36}}$ = ... (in the simplest form).
19	The additive inverse of the $\sqrt{\frac{4}{25}}$ is .....
20	$\sqrt{\frac{144}{169}}$ = ...
21	$\sqrt{6^2+8^2}$ = ...
22	$\sqrt{\frac{49a^4b^2}{9}}$ = ...
23	$\sqrt{\frac{10}{2.5}}$ = ...
24	The value of $\sqrt{(6)^2+64}$ = ...
25	$\sqrt{25x^4}$ = ...
26	The additive inverse of the number $\sqrt{1\frac{9}{16}}$ is .....
27	The side length of a square whose area is $49x^2$ cm^2 is ..... cm.
28	$\sqrt{\frac{16}{49}}$ = ...
29	$\sqrt{\left(\frac{-4}{9}\right)^2}$ = ...
30	$\sqrt{49x^2}$ = ...
31	If $\frac{b}{8}=\frac{9}{2}$, then $\sqrt{b}$ = ...
32	The side length of a square whose area is $9x^2$ cm.^{2} is .....

[C] : Essay Problems : -

1	**Find the value of the expression in simplest form :** $\left(\frac{-1}{3}\right)^2 + \sqrt{\frac{64}{81}} - \left(\frac{3}{7}\right)^0$ 2017 Exam (12) Question (3) (a)
2	**Find :** $\sqrt{\frac{25\,a^2\,b^2}{36}}$ 2017 Exam (14) Question (4) (a)
3	If $(AB)^2 = 36$ cm^2 , $(BC)^2 = 121$ cm^2 and $B \in \overline{AC}$, find the length of $\overline{AC}$ 2018 Exam (14) Question (3) (b)
4	**Simplify (with steps) :** $\left(\frac{-1}{3}\right)^2 \times \sqrt{\frac{81}{64}} \times \left(\frac{3}{7}\right)^0$ 2016 Exam (5) Question (3) (mm)
5	**Find :** $\sqrt{\frac{25\,x^2\,y^4}{36\,a^6\,b^8}}$ where $a \neq 0$, $b \neq 0$ 2017 Exam (15) Question (3) (a)
6	If $\frac{m}{n}$ is a rational number , $\frac{m^2}{n^2} = \frac{16}{100}$ evaluate $\left(\frac{m}{n}\right)^3$ 2018 Exam (1) Question (5) (b)
7	**Simplify to the simplest form :** $\left(\frac{-5}{3}\right)^2 \times \left(\frac{-4}{9}\right)^0 \times \sqrt{3\frac{6}{25}}$ 2018 Exam (6) Question (4) (b)
8	If $(AB)^2 = 144$, $(BC)^2 = 625$, $B \in \overline{AC}$ **find the length of :** $\overline{AC}$ 2017 Exam (11) Question (4) (a)
9	**Find the value of the expression :** $\left(\frac{3}{5}\right)^{\text{zero}} - \sqrt{\frac{49}{81}}$ 2017 Exam (9) Question (3) (a)
10	**Calculate the value of :** $\left(\frac{2}{3}\right)^2 \times \sqrt{\frac{81}{16}} \times \left(\frac{3}{2}\right)^{\text{zero}}$ 2016 Exam (14) Question (4) (a)
11	If $\frac{3}{4}$ of the area of a square is $1\frac{11}{64}$ m^2. Find its side length. 2017 Exam (13) Question (5) (b)
12	ABC is a triangle in which $(AB)^2 = 16$ cm^2 , $(BC)^2 = 25$ cm^2 **Find :** BC – AB 2018 Exam (8) Question (3) (a)

Lesson [2] : Part [2] : The Polygon

Trapezium – Parallelogram – Rectangle – Rhombus – Square

Trapezium :

A quadrilateral in which only two sides are parallel is called a trapezium , as shown in the opposite figure in which :

$\overline{XL} // \overline{YZ}$

Definition

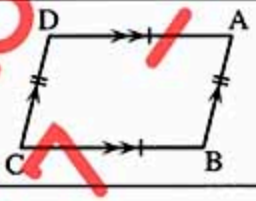
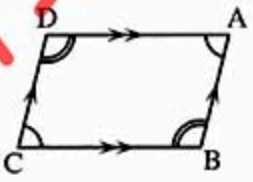
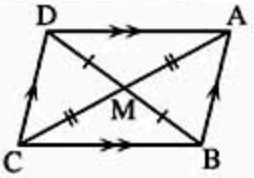
Parallelogram is a quadrilateral , in which each two opposite sides are parallel.

In the opposite figure

ABCD is a parallelogram because

$\overline{AB} // \overline{DC}$ and $\overline{AD} // \overline{BC}$

Properties of parallelogram :

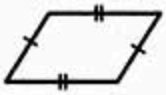
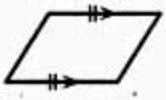
1 Each two opposite sides are equal in length.		• AB = DC • AD = BC
2 Each two opposite angles are equal in measure.		• m (∠ A) = m (∠ C) • m (∠ B) = m (∠ D)
3 The sum of measures of each two consecutive angles is 180°		• m (∠ A) + m (∠ B) = 180° • m (∠ B) + m (∠ C) = 180° • m (∠ C) + m (∠ D) = 180° • m (∠ D) + m (∠ A) = 180°
4 The two diagonals bisect each other.		• AM = CM • BM = DM

Remark [1]

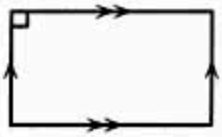
The perimeter of the parallelogram = The sum of two consecutive sides × 2

When does a quadrilateral represent a parallelogram ?

A quadrilateral represents a parallelogram if one of the following conditions satisfies

Each two opposite sides are parallel.	Each two opposite sides are equal in length.	Two opposite sides are parallel and equal in length.	Each two opposite angles are equal in measure.	The two diagonals bisect each other.
				

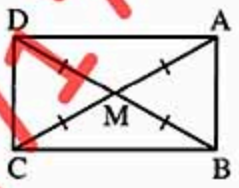
Rectangle :



Rectangle is a parallelogram with a right angle.

Properties Of Rectangle :

The rectangle has the same properties of the parallelogram and some additional properties as the following :

1 The four angles of the rectangle are all equal in measure and the measure of each is 90°		m (∠ A) = m (∠ B) = m (∠ C) = m (∠ D) = 90°
2 The two diagonals of the rectangle are equal in length.		AC = BD and as the two diagonals bisect each other , then AM = BM = CM = DM

Remark [2]

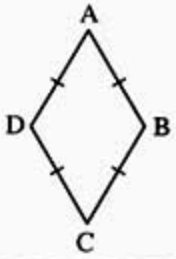
The perimeter of the rectangle = (length + width) × 2

Rhombus :

Rhombus is a parallelogram in which two adjacent sides are equal in length.

Properties Of Rhombus :

The rhombus has the same properties of the parallelogram and some additional properties as the following :

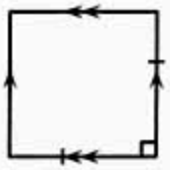
1 The four sides of the rhombus are all equal in length.		• AB = BC = CD = DA
2 The two diagonals of the rhombus are perpendicular and bisect each of its interior angles.		• $\overline{AC} \perp \overline{BD}$ • m (∠ 1) = m (∠ 2) = m (∠ 3) = m (∠ 4) • m (∠ 5) = m (∠ 6) = m (∠ 7) = m (∠ 8)

Remark [3]

The perimeter of the rhombus = the length of one side × 4

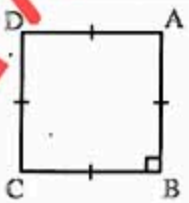
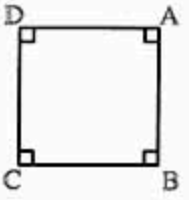
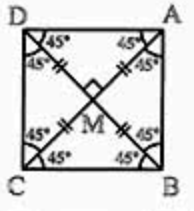
Square :

Square is a parallelogram with a right angle and two adjacent sides are equal in length.



Properties Of Square :

The square has the same properties of the parallelogram and some additional properties as the following :

1 Its four sides are all equal in length.		• AB = BC = CD = DA
2 Its four angles are all equal in measure and each of them is of measure 90°		• m (∠ A) = m (∠ B) = m (∠ C) = m (∠ D) = 90°
3 Its two diagonals are equal in length , perpendicular and each diagonal bisects the two vertices angles which this diagonal joins.		• AC = BD and hence AM = BM = CM = DM • $\overline{AC} \perp \overline{BD}$

Remark [4]

The perimeter of the square = the length of one side × 4

Notice That : -

We can also define the square as follows :

1. A square is a rectangle with two adjacent sides equal in length.
2. A square is a rectangle with two perpendicular diagonals.
3. A square is a rhombus with a right angle.
4. A square is a rhombus with two diagnals equal in length.

Notice That : -

To prove that the quadrilateral is a rectangle , a rhombus or a square , we must first prove that it is a parallelogram , as we see in the previous lesson , then :

The parallelogram is

a rectangle	a rhombus	a square
if :	**if :**	**if :**
One of its angles is a right angle	Two adjacent sides are equal in length.	One of its angles is right and two adjacent sides are equal in length.
or	**or**	**or**
Its two diagonals are equal in length.	Its two diagonals are perpendicular.	One of its angles is right and its two diagonals are perpendicular.
		or
		Its two diagonals are perpendicular and equal in length.
		or
		Two adjacent sides are equal in length and its two diagonals are equal in length.

Examples :

1 Calculate the sum of the measures of the interior angles of a hexagon.

2014 Exam (12) Question (3) (a)

2 Find the measure of each interior angle of regular hexagon.

2014 Exam (9) Question (4) (a)

3 How many sides does a regular polygon have if the measure of each interior angle of it is 120° ?

2014 Exam (6) Question (3) (b)

4 Find the number of sides of a regular polygon if the measure of one of its exterior angle is 45°

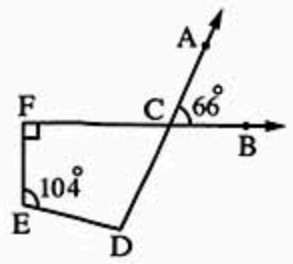
2015 Exam (5) Question (4) (a)

5 **In the opposite figure :**

$\overline{EF} \perp \overrightarrow{FB}$, $\overrightarrow{DA} \cap \overrightarrow{FB} = \{C\}$,

$m(\angle ACB) = 66°$, $m(\angle E) = 104°$

Find : $m(\angle D)$



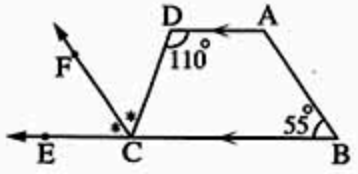
2015 Exam (15) Question (4) (b)

6 **In the opposite figure :**

$\overline{AD} // \overrightarrow{BC}$, $\overrightarrow{CF}$ bisects $\angle DCE$

, $m(\angle ABC) = 55°$, $m(\angle ADC) = 110°$

Prove that : $\overline{AB} // \overrightarrow{CF}$

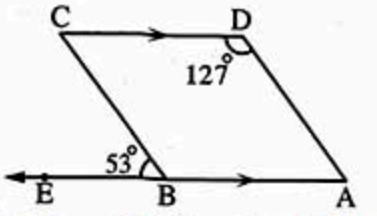


2017 Exam (12) Question (3) (a)

7 **In the opposite figure :**

$\overline{DC} // \overline{AB}$, $E \in \overrightarrow{AB}$, $m(\angle CBE) = 53°$, $m(\angle D) = 127°$

Prove that : $\overline{AD} // \overline{BC}$



2015 Exam (11) Question (3) (a)

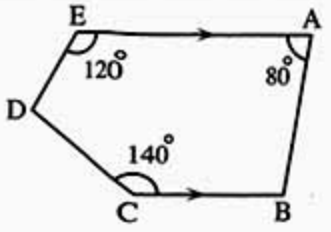
8 **In the opposite figure :**

ABCDE is a pentagon in which $\overline{AE} // \overline{BC}$,

$m(\angle A) = 80°$, $m(\angle C) = 140°$, $m(\angle E) = 120°$

Find : ① $m(\angle B)$

② $m(\angle D)$



2015 Exam (4) Question (4) (a)

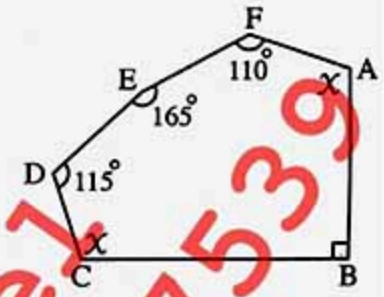
9 **In the opposite figure :**

ABCDEF is a hexagon , m (∠ B) = 90° ,

m (∠ F) = 110° , m (∠ E) = 165° , m (∠ D) = 115° ,

m (∠ FAB) = m (∠ DCB) = χ

Find : the value of χ



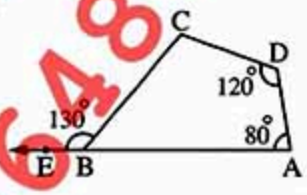
2014 Exam (11) Question (3) (b)

10 **In the opposite figure :**

m (∠ A) = 80° , m (∠ D) = 120°

, m (∠ CBE) = 130°

Find : m (∠ C)



Model Exam (5) Question (5) (a)

Solutions

1 The sum = (6 – 2) × 180° = 720°

2 The measure of each interior angle = $\frac{(6-2)\times 180°}{6}$ = 120°

3 The number of sides = $\frac{360°}{180° - 120°}$ = 6 sides

4 The number of sides = $\frac{360°}{45°}$ = 8 sides

5 ∵ $\overrightarrow{DA} \cap \overrightarrow{FB} = \{C\}$

∴ m (∠ DCF) = m (∠ ACB) = 66° (V.O.A.)

From quadrilateral CDEF :

∴ m (∠ D) = 360° – (104° + 66° + 90°) = 100°

(The req.)

6 ∵ $\overline{AD} // \overline{BC}$, $\overrightarrow{DC}$ is a transversal

∴ m (∠ DCE) = m (∠ ADC) = 110°

(alternate angles)

, ∵ $\overrightarrow{CF}$ bisects ∠ DCE

∴ m (∠ FCE) = $\frac{110°}{2}$ = 55°

, ∵ m (∠ B) = m (∠ FCE) = 55°

and they are corresponding angles.

∴ $\overline{AB} // \overrightarrow{CF}$ (Q.E.D.)

7 ∵ $\overline{DC} // \overline{AB}$, $\overrightarrow{AD}$ is a transversal

∴ m (∠ A) + m (∠ D) = 180°

(Two interior angles in the same side of the transversal).

∴ m (∠ A) = 180° – 127° = 53°

∴ m (∠ A) = m (∠ CBE) = 53°

and they are corresponding angles.

∴ $\overline{AD} // \overline{BC}$ (Q.E.D.)

8 ∵ $\overline{AE} // \overline{BC}$, $\overrightarrow{AB}$ is a transversal

∴ m (∠ A) + m (∠ B) = 180°

Two interior angles in the same side of the transversal.

∴ m (∠ B) = 180° – 80° = 100° (First req.)

From pantagon ABCDE :

∴ m (∠ D) = 540° – (120° + 80° + 100° + 140°)

= 100° (Second req.)

9 ∵ 2 χ = 720° – (110° + 90° + 165° + 115°) = 240°

∴ χ = 240° ÷ 2 = 120° (The req.)

10 ∵ B ∈ $\overrightarrow{AE}$

∴ m (∠ ABC) = 180° – 130° = 50°

∴ From the quadrilateral ABCD :

m (∠ C) = 360° – (50° + 80° + 120°)

= 360° – 250° = 110° (The req.)

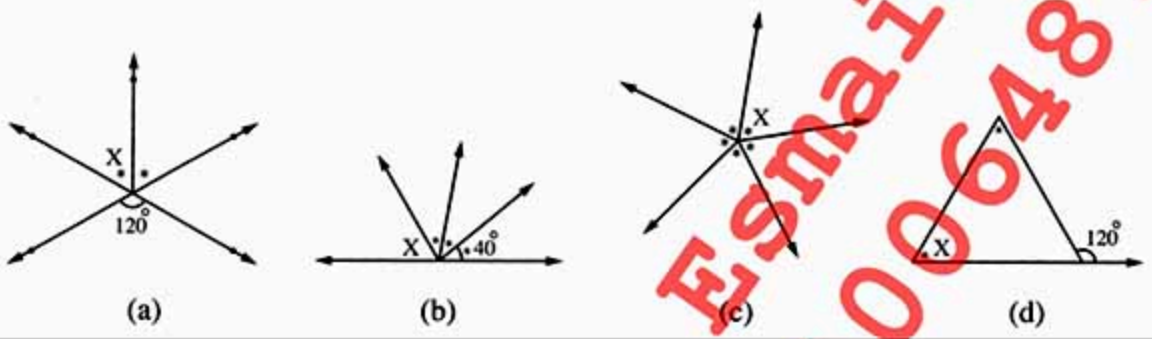
Exercises

[A] : Choose The Correct Answer : -

1 The acute angle supplements ..... angle.

(a) acute (b) right (c) obtuse (d) straight

2 In all the following shapes m (∠ X) = 60° except the shape .....



(a) (b) (c) (d)

3 The sum of measures of the exterior angles of the hexagon = ...

(a) 720 ° (b) 120 ° (c) 180 ° (d) 360 °

4 How many sides has a regular polygon if the measure of each interior angle of it is 120° ?

(a) 5 (b) 6 (c) 7 (d) 8

5 The diagonal of the square makes an angle of measure ..... with any of its sides.

(a) 60° (b) 45° (c) 120° (d) 90°

6 The rectangle is a parallelogram each of its angles is .....

(a) obtuse. (b) acute. (c) right. (d) straight.

7 If ABCD is a rhombus , then $\overline{AC} \perp$ .....

(a) $\overline{BD}$ (b) $\overline{AB}$ (c) $\overline{BC}$ (d) $\overline{CD}$

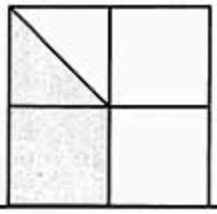
8 The number of axis of symmetry of a square equal .....

(a) 0 (b) 1 (c) 2 (d) 4

9 The angle with measure 70° complement angle with measure .....°

(a) 70 (b) 110 (c) 290 (d) 20

10 The area of the shaded part = ... the total area of the shape.



(a) $\frac{1}{8}$ (b) $\frac{1}{4}$

(c) $\frac{3}{8}$ (d) $\frac{3}{4}$

11 The sum of the measures of the interior angles of a pentagon is .....

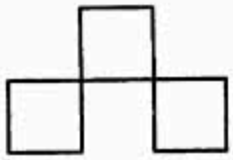
(a) 360° (b) 450° (c) 720° (d) 540°

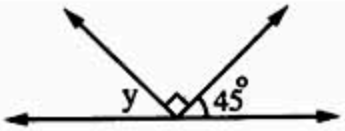
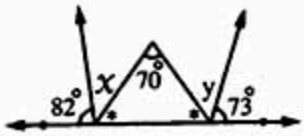
12 The rhombus of diagonals equal in length is .....

(a) a square. (b) a rectangle. (c) a trapezium. (d) a parallelogram.

13	The measure of the interior angle of a regular polygon of 18 sides equals ..... (a) 130° (b) 140° (c) 150° (d) 160°	
14	The diagonals are equal in length and perpendicular in ..... **(a)** square. **(b)** rhombus. **(c)** rectangle. **(d)** parallelogram.	
15	The measure of the right angle = ... ° (a) 180 (b) 90 (c) 120 (d) 0	
16	If ABCD is a parallelogram in which BC = 8 cm. and CD = 6 cm. , then its perimeter = ... (a) 14 cm. (b) 28 cm. (c) 48 cm. (d) 56 cm.	
17	The side length of the rhombus which its perimeter 36 cm. is ..... cm. (a) 6 (b) 9 (c) 18 (d) 4	
18	If ABCD is a square , then $(AC)^2$ = ... (a) AB (b) $(AB)^2$ (c) 2 $(AB)^2$ (d) 4 $(AB)^2$	
19	If $\Delta ABC \equiv \Delta XYZ$, then AB = ... (a) XY (b) YZ (c) XZ (d) BC	
20	The edge length of a cube whose total area is 600 cm^2. is ..... cm. (a) 10 (b) 100 (c) 300 (d) 90	
21	The sum of the measures of the interior angles of a triangle = ...° (a) 90 (b) 360 (c) 180 (d) 540	
22	The measure of each angle of the regular hexagon is ..... (a) 90° (b) 180° (c) 120° (d) 144°	
23	In the ..... the two diagonals are perpendicular and not equal in length. (a) square (b) rhombus (c) rectangle (d) parallelogram	
24	ABCD is a parallelogram , m (∠ A) = 70° , then m (∠ C) = ... ° **(a)** 110 **(b)** 35 **(c)** 70 **(d)** 140	
25	In a parallelogram if the adjacent sides are equal in the length , then the shape is ..... (a) square. (b) rhombus. (c) rectangle. (d) trapezium.	
26	ABCD is a square , then m (∠ BAC) = ...° (a) 90 (b) 60 (c) 45 (d) 30	
27	If the side length of a square is 10.5 cm. , then the perimeter of this square = ... cm. (a) 40 (b) 42 (c) 50 (d) 100	
28	✱ The parallelogram whose two diagonals are equal in length and perpendicular is called ..... **(a)** rectangle. **(b)** square. **(c)** rhombus. **(d)** trapezium.	

[B] : Complete the Following : -

1	The angle of measure 180° its type is .....
2	If two straight lines intersect , then the measures of each two vertically opposite angles are .....
3	A circle its radius length 10 cm. , then its circumference = ... (Consider $\pi = 3.14$)
4	Each two opposite angles in a parallelogram are .....
5	If ABCD is a parallelogram in which : m (∠ A) = 120° , then m (∠ B) = ...°
6	The rectangle is a parallelogram in which one of it's angles is .....
7	The number of axis of symmetry of square is .....
8	The two vertically opposite angles are .....
9	The opposite figure represents 3 squares each of side length 1 cm. , the perimeter of the figure = ... 
10	If two opposite sides in the quadrilateral are parallel , then it is called .....
11	ABCD is parallelogram in which m (∠ A) = 100° , then m (∠ D) = ...°
12	If ABCD is rectangle and if AB = 4 cm. , BD = 5 cm. , then the area of the rectangle = ...
13	Square is a rectangle in which .....
14	The sum of the measures of the accumulative angles at a point is .....°
15	If a straight line intersects two parallel straight lines , then every two interior angles in the same side of the transversal are .....
16	The measure of each interior angle of the regular pentagon = ...

17	If ABCD is a parallelogram in which m (∠ A) = 80° , then m (∠ B) = ...
18	Two diagonals are equal in length and not perpendicular in .....
19	The rhombus with a right angle is .....
20	The measure of the right angle = ...°
21	If two straight lines intersect , then the sum of measures of any two adjacent angles is .....
22	The measure of each interior angle of the regular hexagon is .....°
23	ABCD is a parallelogram in which m (∠ A) = 60° , then m (∠ B) = ...
24	In the parallelogram XYZL , if m (∠ X) = $\frac{1}{2}$ m (∠ Y) , then m (∠ Y) = ...°
25	The length of the side of a rhombus whose perimeter is 24 cm. equals ..... cm.
26	**In the oppoiste figure :** y = ...° 
27	The measure of the straight angle equals .....°
28	Each two opposite angles in a parallelogram are .....
29	The sum of the measures of the angles of the quadrilateral equals .....
30	ABCD is a parallelogram in which m (∠ A) = 50° , then m (∠ B) = ...
31	In the parallelogram XYZL , if m (∠ X) = $\frac{1}{3}$ m (∠ Y) , then m (∠ L) = ...°
32	The number of axes of symmetry of the rhombus is ..... axes.
33	**In the opposite figure :** $x + y$ = ...° 

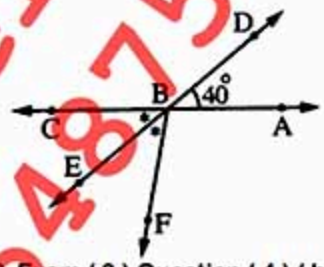
[C] : Essay Problems : -

1 Using the geometric tools , draw the angle ABC of measure 140 , then bisect it. (don't remove arcs).

2017 Exam (12) Question (4) (b)

2 **In the opposite figure :**

Find : m (∠ ABF)



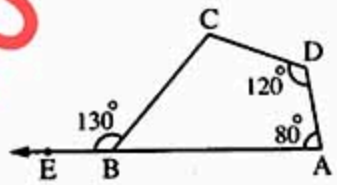
2016 Exam (3) Question (4) (b)

3 **In the opposite figure :**

m (∠ A) = 80° , m (∠ D) = 120° ,

m (∠ CBE) = 130° and B ∈ $\overrightarrow{AE}$

Find with proof : m (∠ C)



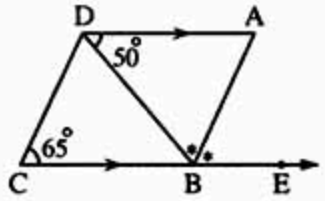
2016 Exam (6) Question (3) (a)

4 **In the opposite figure :**

$\overrightarrow{DA}$ // $\overleftrightarrow{BE}$, $\overrightarrow{BA}$ bisects ∠ DBE ,

m (∠ ADB) = 50° and m (∠ C) = 65°

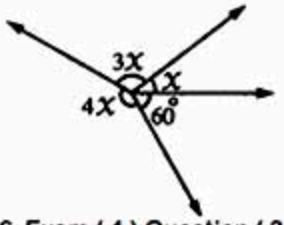
Prove that : ABCD is a parallelogram.



2016 Exam (13) Question (4) (a)

5 **In the opposite figure :**

Find : the value of x



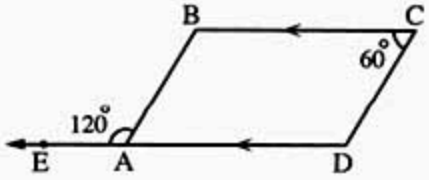
2016 Exam (4) Question (3) (b)

6 **In the opposite figure :**

E ∈ $\overrightarrow{DA}$, m (∠ EAB) = 120°

, m (∠ C) = 60° , $\overrightarrow{DA}$ // $\overrightarrow{CB}$

Prove that : ABCD is a parallelogram

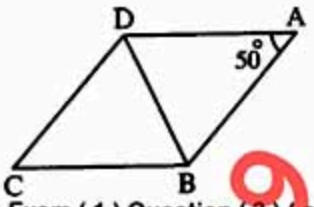


2018 Exam (4) Question (5) (a)

7 **In the opposite figure :**

ABCD is a rhombus in which :

m (∠ A) = 50° , **find :** m (∠ ABD)



2016 Exam (1) Question (3) (a)

8 **In the opposite figure :**

$B \in \overleftrightarrow{AC}$, m (∠ CBE) = 116°

and $\overrightarrow{BD}$ bisect ∠ ABE

Find with proof : m (∠ ABD)

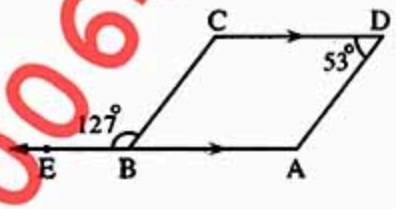
2016 Exam (12) Question (5) (a)

9 **In the opposite figure :**

$\overline{DC} // \overrightarrow{AB}$, m (∠ D) = 53°

and m (∠ CBE) = 127°

Prove that : ABCD is a parallelogram.



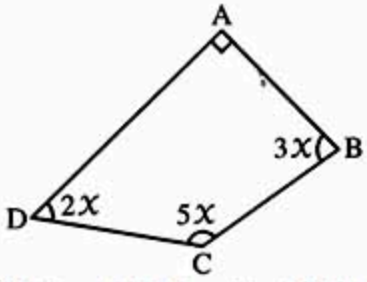
2016 Exam (8) Question (3) (a)

10 **In the opposite figure :**

ABCD is a quadrilateral

in which : m (∠ A) = 90°

Find : the value of x



2018 Exam (11) Question (3) (a)

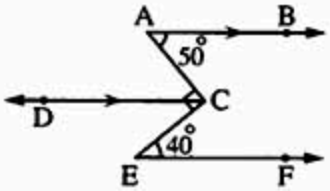
11 **In the opposite figure :**

$\overrightarrow{AB} // \overrightarrow{CD}$, m (∠ A) = 50° ,

∠ ACE is right angle ,

and m (∠ E) = 40°

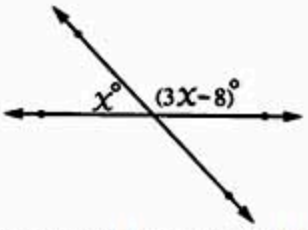
Prove that : $\overrightarrow{AB} // \overrightarrow{EF}$



2016 Exam (5) Question (5) (b)

12 **In the opposite figure :**

Find the value of x



2016 Exam (3) Question (3) (b)

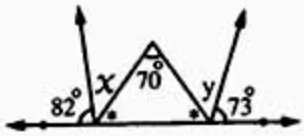
Homework

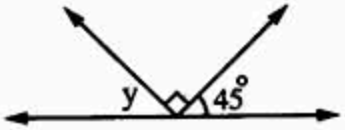
[A] : Choose The Correct Answer : -

1	The side length of the rhombus which its perimeter 36 cm. is ..... cm. (a) 6 (b) 9 (c) 18 (d) 4	
2	ABCD is a parallelogram , m (∠ A) = 70° , then m (∠ C) = ...° (a) 110 (b) 35 (c) 70 (d) 140	
3	The two diagonals are equal in length and not perpendicular in ..... (a) a rectangle (b) a square (c) a rhombus (d) a parallelogram	
4	If the number of sides of a regular polygon is 5 and if the measure of each interior angle is (x°) , then x = ... (a) 90° (b) 108° (c) 120° (d) 180°	
5	If the measure of an interior angle of a regular polygon is 135° , then the number of its sides is ..... (a) 6 (b) 4 (c) 7 (d) 8	
6	In the ..... the two diagonals are perpendicular and not equal in length. (a) square (b) rhombus (c) rectangle (d) parallelogram	
7	The measure of the interior angle of a regular pentagon = ... (a) 900° (b) 180° (c) 540° (d) 108°	
8	The pentagon has ..... sides. (a) 3 (b) 4 (c) 5 (d) 6	
9	The measure of the exterior angle of the equilateral triangle = ... (a) 60° (b) 90° (c) 30° (d) 120°	
10	The measure of each angle of the regular hexagon is ..... (a) 90° (b) 180° (c) 120° (d) 144°	
11	The sum of the measures of the exterior angles of a polygon of n sides is ..... (a) (n – 2) (b) (n – 2) × 180° (c) 360° (d) $\frac{(n-2)\times 180^\circ}{n}$	
12	The two bisectors of two adjacent supplementary angles included an angle of measure .....° (a) 180 (b) 45 (c) 90 (d) 0	
13	The hexagon has ..... sides. (a) 5 (b) 6 (c) 7 (d) 8	
14	The sum of the measures of the interior angles of a triangle = ...° (a) 90 (b) 360 (c) 180 (d) 540	

15	The perpendicular to one of two parallel lines is ..... to the other.				
	(a) parallel	(b) equal	(c) congruent	(d) perpendicular	
16	The angle whose measure 90° is ..... angle.				
	(a) acute	(b) right	(c) obtuse	(d) straight	
17	The area of the circle = ...				
	(a) πr	(b) πr^2	(c) $2 \pi r$	(d) $2 \pi r^2$	
18	The edge length of a cube whose total area is 600 cm^2. is ..... cm.				
	(a) 10	(b) 100	(c) 300	(d) 90	
19	The sum of the measures of the accumulative angles at a point = ...				
	(a) 90°	(b) 180°	(c) 270°	(d) 360°	
20	The area of square of side length 3 cm is ..... cm^2				
	(a) 9	(b) 6	(c) 12	(d) 3	
21	The perimeter of a square with side length 6 cm. = ... cm.				
	(a) 30	(b) 36	(c) 24	(d) 216	
22	The diagonal of square divided its vertex angle in two angles of the measure of each of them is				
	(a) 30°	(b) 45°	(c) 60°	(d) 90°	
23	If $\Delta ABC \equiv \Delta XYZ$, then AB = ...				
	(a) XY	(b) YZ	(c) XZ	(d) BC	
24	If the side length of a square is 10.5 cm. , then the perimeter of this square = ... cm.				
	(a) 40	(b) 42	(c) 50	(d) 100	
25	✱ The parallelogram whose two diagonals are equal in length and perpendicular is called				
	(a) rectangle.	(b) square.	(c) rhombus.	(d) trapezium.	
26	The rectangle of perpendicular diagonals is				
	(a) a parallelogram.	(b) a square.	(c) a rhombus.	(d) a trapezium.	
27	If ABCD is a rhombus and m ($\angle$ ACB) = 32° , then m ($\angle$ B) = ...				
	(a) 148°	(b) 161°	(c) 116°	(d) 32°	
28	If ABCD is a square , then $(AC)^2$ = ...				
	(a) AB	(b) $(AB)^2$	(c) $2 (AB)^2$	(d) $4 (AB)^2$	
29	ABCD is a square , then m ($\angle$ BAC) = ...°				
	(a) 90	(b) 60	(c) 45	(d) 30	
30	If ABCD is a parallelogram , then m ($\angle$ A) = m ($\angle$ .....)				
	(a) B	(b) C	(c) D	(d) nothing	

[B] : Complete the Following : -

1	The angle of measure 180° its type is .....
2	The two vertically opposite angles are .....
3	The measure of each interior angle of the regular pentagon = ...
4	In the parallelogram XYZL , if m (∠ X) = $\frac{1}{2}$ m (∠ Y) , then m (∠ Y) = ...°
5	The number of axes of symmetry of the rhombus is ..... axes.
6	The number of axis of symmetry of square is .....
7	If a straight line intersects two parallel straight lines , then every two interior angles in the same side of the transversal are .....
8	ABCD is a parallelogram in which m (∠ A) = 60° , then m (∠ B) = ...
9	In the parallelogram XYZL , if m (∠ X) = $\frac{1}{3}$ m (∠ Y) , then m (∠ L) = ...°
10	**In the opposite figure :** $x + y$ = ...° 
11	The rectangle is a parallelogram in which one of it's angles is .....
12	The sum of the measures of the accumulative angles at a point is .....°
13	The measure of each interior angle of the regular hexagon is .....°
14	ABCD is a parallelogram in which m (∠ A) = 50° , then m (∠ B) = ...
15	The two diagonals of the rhombus are .....
16	If ABCD is a parallelogram in which : m (∠ A) = 120° , then m (∠ B) = ...°
17	Square is a rectangle in which .....

18	If two straight lines intersect , then the sum of measures of any two adjacent angles is .....
19	The sum of the measures of the angles of the quadrilateral equals .....
20	ABCD is a parallelogram in which m (∠ A) = 130° , then m (∠ B) = ...°
21	Each two opposite angles in a parallelogram are .....
22	If ABCD is rectangle and if AB = 4 cm. , BD = 5 cm. , then the area of the rectangle = ...
23	The measure of the right angle = ...°
24	Each two opposite angles in a parallelogram are .....
25	The parallelogram whose diagonals are equal in length and not perpendicular is .....
26	A circle its radius length 10 cm. , then its circumference = ... (Consider $\pi = 3.14$)
27	ABCD is parallelogram in which m (∠ A) = 100° , then m (∠ D) = ...°
28	The rhombus with a right angle is .....
29	The measure of the straight angle equals .....°
30	The sum of the measures of the exterior angles of the convex polygon = ...
31	If two straight lines intersect , then the measures of each two vertically opposite angles are .....
32	If two opposite sides in the quadrilateral are parallel , then it is called .....
33	Two diagonals are equal in length and not perpendicular in .....
34	**In the oppoiste figure :** y = ...° 

[C] : Essay Problems : -

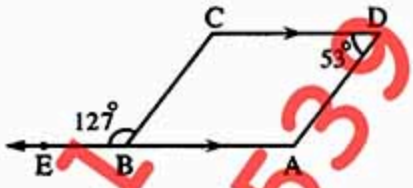
1

In the opposite figure :

$\overrightarrow{DC} // \overrightarrow{AB}$, m ($\angle$ D) = 53°

and m ($\angle$ CBE) = 127°

Prove that : ABCD is a parallelogram.



2016 Exam (8) Question (3) (a)

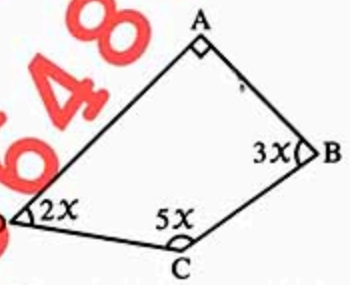
2

In the opposite figure :

ABCD is a quadrilateral

in which : m ($\angle$ A) = 90°

Find : the value of x



2018 Exam (11) Question (3) (a)

3

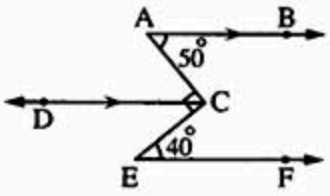
In the opposite figure :

$\overrightarrow{AB} // \overrightarrow{CD}$, m ($\angle$ A) = 50° ,

$\angle$ ACE is right angle ,

and m ($\angle$ E) = 40°

Prove that : $\overrightarrow{AB} // \overrightarrow{EF}$

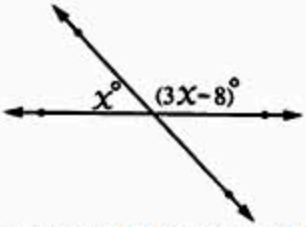


2016 Exam (5) Question (5) (b)

4

In the opposite figure :

Find the value of x



2016 Exam (3) Question (3) (b)

5

Find the number of sides of the regular polygon if the measure of its interior angle is 135°

2016 Exam (14) Question (5) (a)

6

Mention two cases of congruency of two triangles.

2017 Exam (12) Question (5) (a)

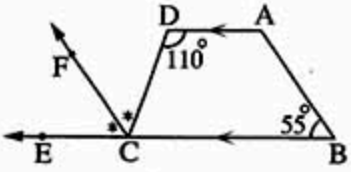
7

In the opposite figure :

$\overrightarrow{AD} // \overrightarrow{BC}$, $\overrightarrow{CF}$ bisects $\angle$ DCE

, m ($\angle$ ABC) = 55° , m ($\angle$ ADC) = 110°

Prove that : $\overrightarrow{AB} // \overrightarrow{CF}$

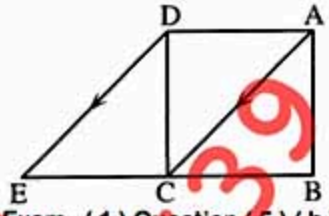


2017 Exam (11) Question (5) (b)

8 **In the opposite figure :**

ABCD is a square , $E \in \overrightarrow{BC}$, $\overline{AC} \parallel \overline{DE}$

Prove that : ACED is a parallelogram.



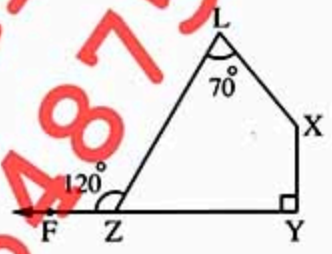
Model 2018 Exam (1) Question (5) (b)

9 **In the opposite figure :**

$F \in \overrightarrow{YZ}$, m ($\angle$ L) = 70°

, m ($\angle$ Y) = 90° and m ($\angle$ LZF) = 120°

Find : m ($\angle$ X)



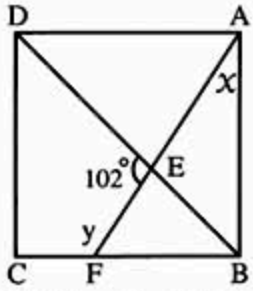
2018 Exam (13) Question (3) (b)

10 **In the opposite figure :**

ABCD is a square

, find in degrees the value

of each of x and y



2018 Exam (12) Question (4) (a)

11 **In the opposite figure :**

ABCD is a parallelogram in which :

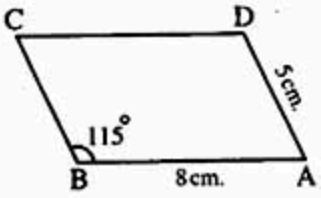
m ($\angle$ B) = 115° , AB = 8 cm.

and AD = 5 cm.

Find with proof :

(1) m ($\angle$ D)

(2) The perimeter of parallelogram ABCD



2016 Exam (14) Question (4) (a)

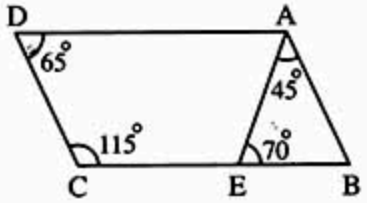
12 **In the opposite figure :**

$E \in \overline{BC}$, m ($\angle$ BAE) = 45° ,

m ($\angle$ AEB) = 70° , m ($\angle$ D) = 65°

and m ($\angle$ C) = 115°

Prove that : ABCD is a parallelogram.

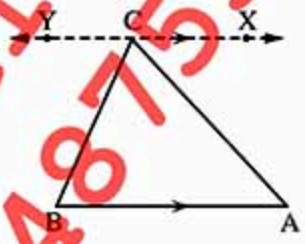


2018 Exam (14) Question (4) (b)

Lesson [3] : The Triangle

Theorem (1)

The sum of the measures of the interior angles of a triangle is 180°



Given ABC is a triangle

R.T.P. $m(\angle A) + m(\angle B) + m(\angle ACB) = 180°$

Construction Draw $\overleftrightarrow{CX} // \overline{AB}$

Proof

$\because \angle XCY$ is a straight angle

$\therefore m(\angle XCA) + m(\angle ACB) + m(\angle BCY) = 180°$

$\because \overleftrightarrow{XY} // \overline{AB}$

$\therefore m(\angle XCA) = m(\angle A)$ (alternate angles)

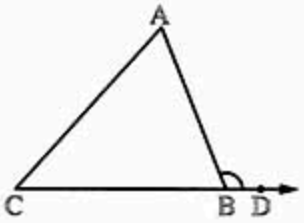
, $m(\angle YCB) = m(\angle B)$ (alternate angles)

$\therefore m(\angle A) + m(\angle ACB) + m(\angle B) = 180°$ (Q.E.D.)

The exterior angle of the triangle

In the opposite figure :

If ABC is a triangle , $D \in \overleftrightarrow{CB}$ and $D \notin \overline{CB}$, then $\angle ABD$ is called an exterior angle of ΔABC

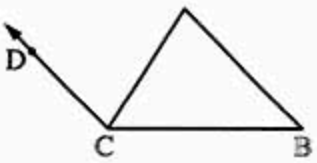


$\therefore m(\angle ABD) = m(\angle A) + m(\angle C)$

Notice That : -

In the opposite figure :

$\angle ACD$ is not an exterior angle of ΔABC because $D \notin \overrightarrow{BC}$



The measure of the exterior angle of a triangle :

The measure of the exterior angle of a triangle is equal to the sum of the measures of its non adjacent interior angles.

The measure of the exterior angle of a triangle is greater than the measure of any interior angle of the triangle except its adjacent angle.

Remark [1]

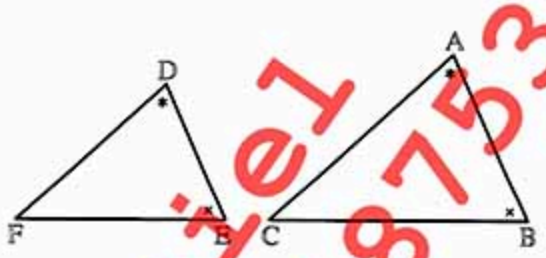
If two angles of one triangle equal two angles of another triangle in measure , then the third angle of the first triangle is equal in measure to the third angle of the other triangle.

In ΔΔ ABC and DEF ,

if m (∠ A) = m (∠ D) and m (∠ B) = m (∠ E) ,

then m (∠ C) = m (∠ F)

"You can check the truth of the previous by measuring"



Remark [2]

- If the sum of measures of two angles in a triangle equals 90° , then the third angle is right.
- If the sum of measures of two angles in a triangle is less than 90° , then the third angle is obtuse.
- If the sum of measures of two angles in a triangle is more than 90° , then the third angle is acute.

Remark [3]

If the measure of an angle in a triangle equals the sum of measures of the other two angles , then the triangle is right-angled.

Theorem (2)

The ray drawn from the midpoint of a side of a triangle parallel to another side bisects the third side.

Given D is the midpoint of $\overline{AB}$, $\overrightarrow{DE} \parallel \overline{BC}$

R.T.P. E is the midpoint of $\overline{AC}$

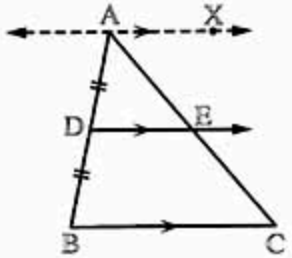
Construction Draw $\overleftrightarrow{AX} \parallel \overline{BC}$

Proof $\because \overleftrightarrow{AX} \parallel \overrightarrow{DE} \parallel \overline{BC}$

, $\overleftrightarrow{AB}$ and $\overleftrightarrow{AC}$ are two transversals to them at D and E respectively.

, $\because$ AD = DB $\quad\quad$ $\therefore$ AE = EC

$\therefore$ E is the midpoint of $\overline{AC}$ (Q.E.D.)

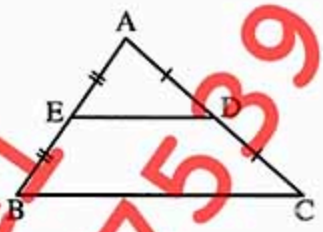


Corollary

The line segment joining the midpoints of two sides of a triangle is parallel to the third side.

In the opposite figure :

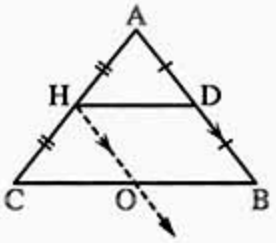
If ABC is a triangle in which D is the midpoint of $\overline{AC}$,
E is the midpoint of $\overline{AB}$, then : $\overline{ED} \parallel \overline{BC}$



Theorem (3)

The length of the line segment joining the midpoints of two sides of a triangle is equal to half the length of the third side.

Given : ABC is a triangle , D is the midpoint of $\overline{AB}$, H is the midpoint of $\overline{AC}$



R.T.P. : $DH = \frac{1}{2} BC$

Construction : Draw $\overrightarrow{HO} \parallel \overline{AB}$ to cut $\overline{BC}$ at O

Proof :

$\because$ D is the midpoint of $\overline{AB}$, H is the midpoint of $\overline{AC}$

$\therefore \overline{DH} \parallel \overline{BC}$ (corollary)

, $\because \overrightarrow{HO} \parallel \overline{AB}$ (construction) , H is the midpoint of $\overline{AC}$

$\therefore$ O is the midpoint of $\overline{BC}$ $\quad \therefore BO = \frac{1}{2} BC$

, $\because$ The figure DHOB is a parallelogram.

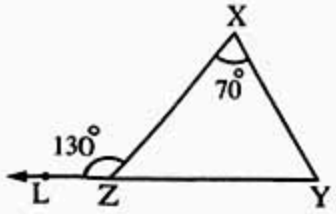
$\therefore DH = BO = \frac{1}{2} BC$ (Q.E.D.)

Examples :

1 **In the opposite figure :**

XYZ is a triangle , $L \in \overrightarrow{YZ}$, $m(\angle XZL) = 130°$,
$m(\angle X) = 70°$

Find with proof : (1) $m(\angle Y)$ (2) $m(\angle YZX)$

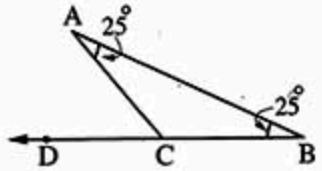


2015 Exam (9) Question (5) (a)

2 **In the opposite figure :**

$m(\angle A) = m(\angle B) = 25°$

Find : $m(\angle ACD)$



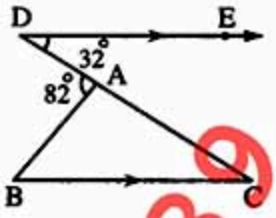
Model Exam (1) Question (3) (a)

3 **In the oposite figure :**

$\overrightarrow{DE} // \overline{BC}$, m (∠ DAB) = 82°

and m (∠ D) = 32°

Find by proof : m (∠ B)



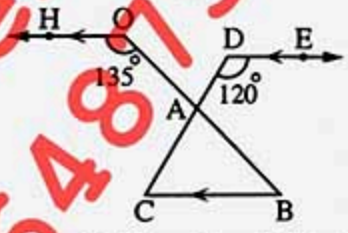
2016 Exam (7) Question (3) (a)

4 **In the opposite figure :** $\overrightarrow{DE} // \overrightarrow{OH} // \overline{BC}$

, m (∠ ADE) = 120°

, m (∠ AOH) = 135°

Find the measures of the angles of : Δ ABC

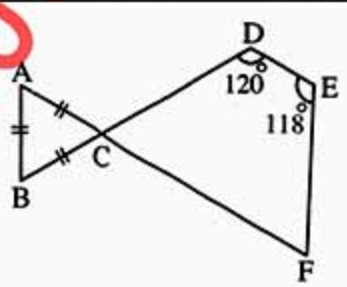


2014 Exam (2) Question (3) (a)

5 **In the opposite figure :**

EDCF is a quadrilateral , Δ ABC is an equilateral triangle where $\overline{DB} \cap \overline{AF} = \{C\}$

Find with proof : m (∠ F)



2015 Exam (5) Question (4) (b)

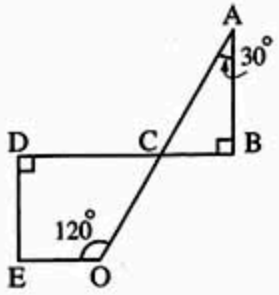
6 **In the opposite figure :**

$\overline{AB}$ and $\overline{ED}$ are perpendicular to $\overline{BD}$, $\overline{BD} \cap \overline{AO} = \{C\}$,

m (∠ A) = 30°

, m (∠ EOC) = 120° ,

Find : m (∠ E)

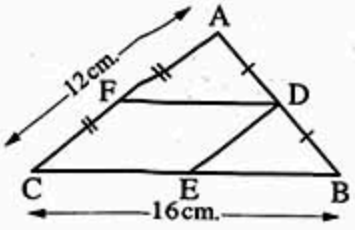


Model Exam (2) Question (4) (b)

7 **In the opposite figure :**

ABC is triangle in which D , E and F are the midpoints of $\overline{AB}$, $\overline{BC}$ and $\overline{CA}$ respectively , BC = 16 cm. , AC = 12 cm.

Find the perimeter of the quadrilateral : DECF with proof



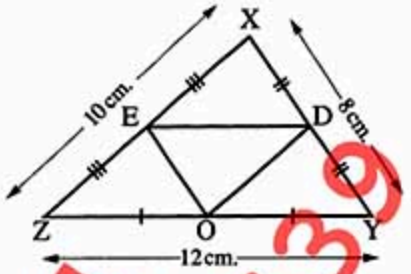
2015 Exam (15) Question (4) (a)

8 **In the opposite figure :**

D , O and E are midpoints of $\overline{XY}$, $\overline{YZ}$ and $\overline{XZ}$ respectively.

, XY = 8 cm. , YZ = 12 cm. , XZ = 10 cm.

Find with proof : The perimeter of Δ EOD



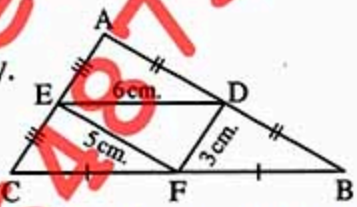
2017 Exam (9) Question (5) (a)

9 **In the opposite figure :**

E , D and F are the midpoints of $\overline{AC}$, $\overline{AB}$ and $\overline{BC}$ respectively.

ED = 6 cm. , DF = 3 cm. and EF = 5 cm.

Find with proof : The perimeter of Δ ABC



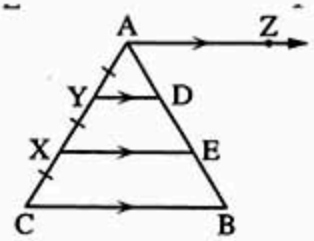
2017 Exam (5) Question (3) (b)

10 **In the opposite figure :**

$\overrightarrow{AZ}$ // $\overline{YD}$ // $\overline{XE}$ // $\overline{CB}$,

AY = YX = XC , AB = 18 cm. ,

Find : The length of $\overline{EB}$



Model Exam (1) Question (4) (b)

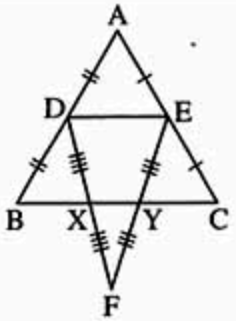
11 **In the opposite figure :**

D is the midpoint of $\overline{AB}$, E is the midpoint of $\overline{AC}$

, DX = XF , EY = FY

, BC = 12 cm.

Find : The length of $\overline{XY}$



2017 Exam (5) Question (4) (b)

Solutions

1

∵ ∠ XZL is an exterior angle of Δ XYZ

∴ m (∠ Y) = 130° – 70° = 60° (First req.)

∴ From Δ XYZ : m (∠ YZX) = 180° – (70° + 60°)

= 50° (Second req.)

2

∵ m (∠ A) = m (∠ B) = 25°

, ∠ ACD is an exterior angle of Δ ABC

∴ m (∠ ACD) = 25° + 25° = 50° (The req.)

3

$\because \overrightarrow{DE} // \overline{BC}$, $\overleftrightarrow{CD}$ is a transversal

$\therefore m(\angle C) = m(\angle D) = 32°$ (alternate angles)

, $\because \angle DAB$ is an exterior angle of ΔABC

$\therefore m(\angle B) = 82° - 32° = 50°$ (The req.)

4

$\because \overrightarrow{OH} // \overline{BC}$, $\overleftrightarrow{OB}$ is a transversal

$\therefore m(\angle B) + m(\angle O) = 180°$

(Two interior angles in the same side of the transversal)

$\therefore m(\angle B) = 180° - 135° = 45°$

$\because \overrightarrow{DE} // \overline{BC}$, $\overleftrightarrow{CD}$ is a transversal

$\therefore m(\angle C) + m(\angle D) = 180°$

(Two interior angles in the same side of the transversal)

$\therefore m(\angle C) = 180° - 120° = 60°$

In ΔABC : $\therefore m(\angle BAC) = 180° - (45° + 60°) = 75°$

(The req.)

5

$\because \Delta ABC$ is an equilateral triangle.

$\therefore m(\angle ACB) = \frac{180°}{3} = 60°$

$\therefore m(\angle DCF) = m(\angle ACB) = 60°$ (V.O.A)

From quadrilateral EDCF :

$\therefore m(\angle F) = 360° - (60° + 120° + 118°)$

$= 62°$ (The req.)

6

In ΔABC : $m(\angle ACB) = 180° - (90° + 30°) = 60°$

, $\because \overline{BD} \cap \overline{AO} = \{C\}$

$\therefore m(\angle ACB) = m(\angle OCD) = 60°$ (V.O.A)

$\therefore m(\angle E) = 360° - (60° + 120° + 90°) = 90°$

(The req.)

7

$\because$ D is the midpoint of $\overline{AB}$

, E is the midpoint of $\overline{BC}$

$\therefore DE = \frac{1}{2} AC = \frac{1}{2} \times 12 = 6$ cm.

, $\because$ D is the midpoint of $\overline{AB}$

, F is the midpoint of $\overline{AC}$

$\therefore DF = \frac{1}{2} BC = \frac{1}{2} \times 16 = 8$ cm.

, $\because$ E is the midpoint of $\overline{BC}$

$\therefore CE = \frac{1}{2} BC = \frac{1}{2} \times 16 = 8$ cm.

, $\because$ F is the midpoint of $\overline{AC}$

$\therefore CF = \frac{1}{2} AC = \frac{1}{2} \times 12 = 6$ cm.

$\therefore$ The perimeter of DECF = 6 + 8 + 6 + 8

= 28 cm. (The req.)

8

In ΔXYZ : $\because$ E is the midpoint of $\overline{XZ}$

, O is the midpoint of $\overline{ZY}$

$\therefore EO = \frac{1}{2} XY = \frac{1}{2} \times 8 = 4$ cm.

, $\because$ O is the midpoint of $\overline{ZY}$

, D is the midpoint of $\overline{XY}$

$\therefore OD = \frac{1}{2} \times ZX = \frac{1}{2} \times 10 = 5$ cm.

, $\because$ D is the midpoint of $\overline{XY}$

, E is the midpoint of $\overline{XZ}$

$\therefore ED = \frac{1}{2} YZ = \frac{1}{2} \times 12 = 6$ cm.

$\therefore$ The perimeter of $\Delta EOD = 4 + 5 + 6$

= 15 cm. (The req.)

9

$\because$ In ΔABC : $\because$ D is the midpoint of $\overline{AB}$

, E is the midpoint of $\overline{AC}$

$\therefore BC = 2 DE = 2 \times 6 = 12$ cm.

, $\because$ D is the midpoint of $\overline{AB}$

, F is the midpoint of $\overline{BC}$

$\therefore AC = 2 DF = 2 \times 3 = 6$ cm.

, $\because$ E is the midpoint of $\overline{AC}$

, F is the midpoint of $\overline{BC}$

$\therefore AB = 2 EF = 2 \times 5 = 10$ cm.

$\therefore$ the perimeter of $\Delta ABC = 12 + 6 + 10$

= 28 cm. (The req.)

10

$\because \overrightarrow{AZ} // \overline{YD} // \overline{XE} // \overline{CB}$, AY = YX = XC

$\therefore AD = DE = EB$

$\therefore EB = \frac{18}{3} = 6$ cm. (The req.)

11

In ΔABC : $\because$ D is the midpoint of $\overline{AB}$

, E is the midpoint of $\overline{AC}$

$\therefore DE = \frac{1}{2} BC = \frac{1}{2} \times 12 = 6$ cm.

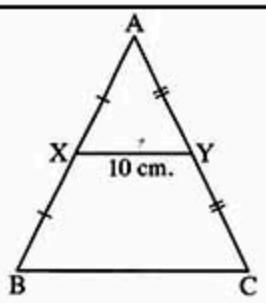
, In ΔEFD : $\because$ X is the midpoint of $\overline{FD}$

, Y is the midpoint of $\overline{EF}$

$\therefore XY = \frac{1}{2} ED = \frac{1}{2} \times 6 = 3$ cm. (The req.)

Exercises

[A] : Choose The Correct Answer : -

1	The sum of measures of the angles of a triangle is ..... (a) 90° (b) 180° (c) 270° (d) 360°
2	The parallelogram whose two diagonals are ..... is called a rectangle. (a) parallel (b) perpendicular (c) equal in length (d) bisect each other
3	The rectangle is a parallelogram each of its angles is ..... (a) obtuse. (b) acute. (c) right. (d) straight.
4	The two diagonals are equal in length and not perpendicular in ..... (a) a rectangle (b) a square (c) a rhombus (d) a parallelogram
5	The sum of measures of the exterior angles of the hexagon = ... (a) 720 ° (b) 120 ° (c) 180 ° (d) 360 °
6	The area of the circle = ... (a) πr (b) πr^2 (c) $2 \pi r$ (d) $2 \pi r^2$
7	**In the opposite figure :** X and Y are midpoints of $\overline{AB}$ and $\overline{AC}$ respectively , XY = 10 cm. , then BC = ... cm. (a) 5 (b) 10 (c) 20 (d) 30 
8	The length of the line segment joining the midpoints of two sides of a triangle is equal to ..... the length of the third side. (a) half (b) quarter (c) twice (d) third
9	Any triangle has at least two ..... angles. (a) reflex (b) obtuse (c) acute (d) right
10	The diagonals are equal in length and perpendicular in ..... (a) square. (b) rhombus. (c) rectangle. (d) parallelogram.
11	In the ..... the two diagonals are perpendicular and not equal in length. (a) square (b) rhombus (c) rectangle (d) parallelogram
12	The measure of the exterior angle of the equilateral triangle = ... (a) 60° (b) 90° (c) 30° (d) 120°

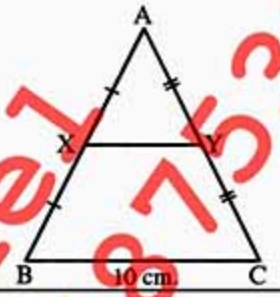
13 The two bisectors of two adjacent supplementary angles included an angle of measure .....°

(a) 180 (b) 45 (c) 90 (d) 0

14 **In the opposite figure :**

X , Y are midpoints of $\overline{AB}$, $\overline{AC}$ respectively , BC = 10 cm.

, then XY = ... cm.



(a) 5 (b) 20

(c) 10 (d) 30

15 The length of the line segment joining between two midpoints of two sides of a triangle = ... length of its third side.

(a) $\frac{1}{5}$ (b) $\frac{1}{4}$ (c) $\frac{1}{3}$ (d) $\frac{1}{2}$

16 The sum of the interior angles of an isosceles triangle = ...

(a) 180° (b) 90° (c) 60° (d) 45°

17 If ABCD is a square , then $(AC)^2$ = ...

(a) AB (b) $(AB)^2$ (c) $2(AB)^2$ (d) $4(AB)^2$

18 ABCD is a square , then m (∠ BAC) = ...°

(a) 90 (b) 60 (c) 45 (d) 30

19 The measure of the interior angle of a regular pentagon = ...

(a) 900° (b) 180° (c) 540° (d) 108°

20 If the number of sides of a regular polygon is 5 and if the measure of each interior angle is (x°) , then x = ...

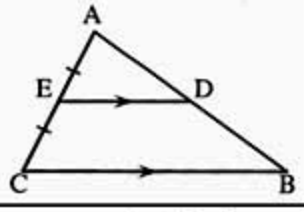
(a) 90° (b) 108° (c) 120° (d) 180°

21 The perpendicular to one of two parallel lines is ..... to the other.

(a) parallel (b) equal (c) congruent (d) perpendicular

22 **In the opposite figure :**

ED : BC = ... : .....



(a) 1 : 1 (b) 1 : 2

(c) 1 : 3 (d) 1 : 4

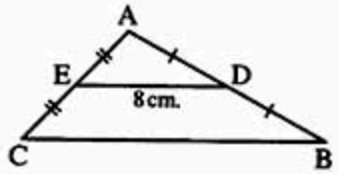
23 The line segment joining the midpoints of two sides of a triangle is ..... the third side.

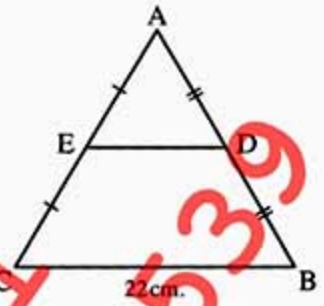
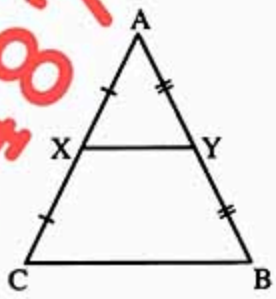
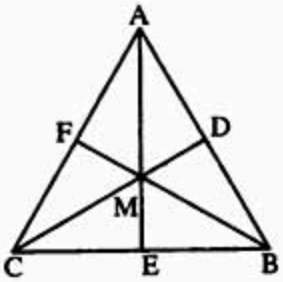
(a) perpendicular to (b) equal to (c) parallel to (d) bisect to

24 The sum of the measures of the exterior angles of triangle = ...

(a) 90° (b) 180° (c) 360° (d) 120°

[B] : Complete the Following : -

1	Any triangle has at least two ..... interior angles.
2	The number of axis of symmetry of the isosceles triangle = ...
3	The sum of the measures of the interior angles of a triangle = ...°
4	The measure of the exterior angle of a triangle is .....
5	The measure of the exterior angle of any vertex of the equilateral triangle = ...°
6	The measure of the exterior angle of a triangle is equal to the sum of .....
7	The ray drawn from the midpoint of a side of a triangle parallel to another side ..... the third side.
8	The ray drawn parallel to one side of triangle and passing through the midpoint of another side .....
9	The line segment joining midpoints of two sides of a triangle is .....
10	The line segment joining between two midpoints of two sides of triangle is parallel to .....
11	The line segment joining the midpoint of two sides of a triangle is ..... the third side.
12	The length of the line segment joining the midpoints of two sides of a triangle is equal to ..... the third side.
13	The length of the line segment joining the midpoints of two sides of a triangle equals .....
14	**In the opposite figure :** If ED = 8 cm. , then BC = ... cm. 

15	**In the opposite figure :** If BC = 22 cm. , then ED = ... cm. 
16	**In the opposite figure :** $\overline{XY}$ // ..... 
17	**In the opposite figure :** ABC is an equilateral triangle where D , E and F are the midpoints of $\overline{AB}$, $\overline{BC}$ and $\overline{AC}$ respectively , and $\overline{AE} \cap \overline{BF} \cap \overline{CD} = \{M\}$ Then the image of Δ AMD by reflection in $\overleftrightarrow{AE}$ is ..... 
18	The angle of measure 180° its type is .....
19	The measure of the straight angle equals .....°
20	The measure of the right angle = ...°
21	The sum of the measures of the accumulative angles at a point is .....°
22	The two vertically opposite angles are .....
23	If two straight lines intersect , then the measures of each two vertically opposite angles are .....
24	Every two vertically opposite angles are ..... in measure.
25	Each two opposite angles in a parallelogram are .....

[C] : Essay Problems : -

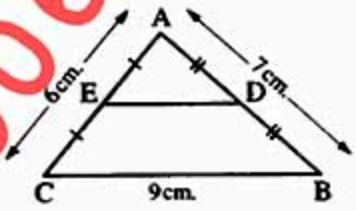
1 **Prove that :** the ray drawn from the midpoint of a side of a triangle parallel to another side bisects the third side.

2018 Exam (4) Question (3) (a)

2 **In the oposite figure :**
$\overleftrightarrow{DE} // \overline{BC}$, m ($\angle$ DAB) = 82°
and m ($\angle$ D) = 32°
Find by proof : m ($\angle$ B)

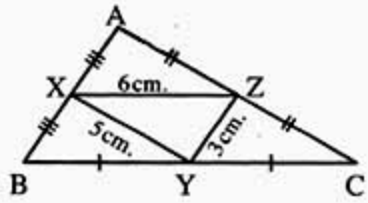
2016 Exam (7) Question (3) (a)

3 **In the opposite figure :**
ABC is a triangle in which D and E are the midpoints of $\overline{AB}$ and $\overline{AC}$ respectively , AB = 7 cm. , BC = 9 cm. and AC = 6 cm.
Find : the perimeter of Δ ADE



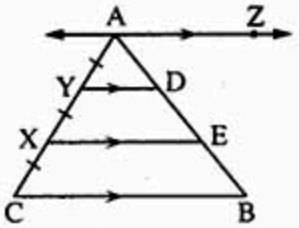
2016 Exam (11) Question (3) (b)

4 **In the opposite figure :**
X , Y , Z are the midpoints of $\overline{AB}$, $\overline{BC}$, $\overline{CA}$ respectively.
If XY = 5 cm. , YZ = 3 cm. and XZ = 6 cm.
Find with proof the perimeter of Δ ABC



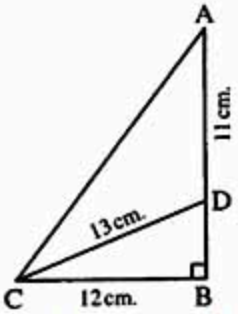
2018 Exam (6) Question (3) (b)

5 **In the opposite figure :**
$\overleftrightarrow{AZ} // \overline{YD} // \overline{XE} // \overline{BC}$,
AY = YX = XC and AB = 12 cm.
Find : the length of $\overline{AD}$



2016 Exam (9) Question (5) (a)

6 **In the opposite figure :**
ABC is a triangle in which
m ($\angle$ B) = 90° ,
D $\in \overline{AB}$ such that AD = 11 cm.
If BC = 12 cm. , DC = 13 cm. ,
find : the length of each of $\overline{BD}$ and $\overline{AC}$



2016 Exam (3) Question (5) (a)

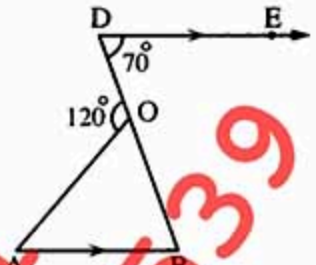
7 **In the opposite figure :**

$\overline{AB} // \overrightarrow{DE}$,

$m(\angle D) = 70°$

and $m(\angle DOA) = 120°$

Find with proof : $m(\angle A)$



2016 Exam (9) Question (3) (b)

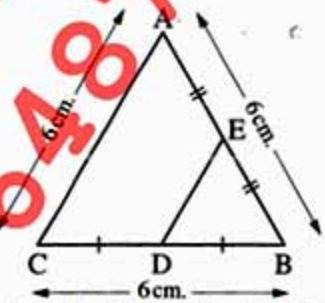
8 **In the opposite figure :**

ΔABC is an equilateral triangle whose side length 6 cm.

, D is the midpoint of $\overline{BC}$

, E is the midpoint of $\overline{BA}$

Prove that : ΔEBD is an equilateral triangle and find its perimeter.



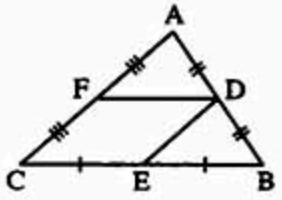
2017 Exam (14) Question (3) (a)

9 **In the opposite figure :**

The points D , E and F are midpoints of $\overline{AB}$, $\overline{BC}$ and $\overline{AC}$ respectively ,

BC = 5 cm. and AC = 7 cm.

Find by proof : the perimeter of the quadrilateral DECF



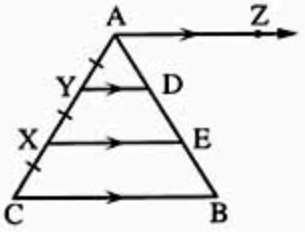
2016 Exam (7) Question (3) (b)

10 **In the opposite figure :**

$\overrightarrow{AZ} // \overline{YD} // \overline{XE} // \overline{CB}$,

AY = YX = XC , AB = 18 cm. ,

Find : The length of $\overline{EB}$



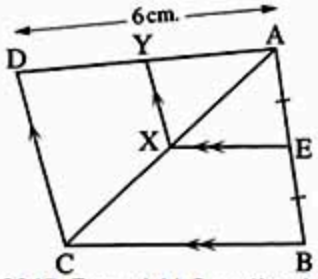
Model 2018 Exam (1) Question (4) (b)

11 **In the opposite figure :**

AE = EB , $\overline{EX} // \overline{BC}$

, $\overline{XY} // \overline{CD}$ and AD = 6 cm.

Find : The length of $\overline{AY}$



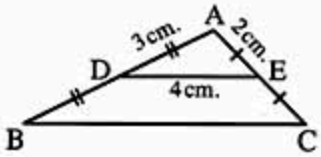
2017 Exam (4) Question (4) (a)

12 **In the opposite figure :**

D , E are midpoints of $\overline{AB}$, $\overline{AC}$ respectively

AD = 3 cm. , AE = 2 cm. , DE = 4 cm.

Find : the perimeter of ΔABC



2018 Exam (5) Question (4) (a)

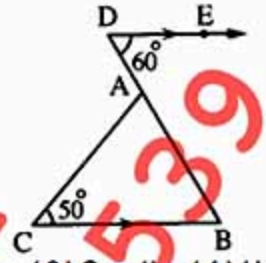
13 **In the opposite figure :**

$\overrightarrow{DE} // \overline{CB}$,

m (∠ D) = 60° ,

m (∠ C) = 50°

Find : m (∠ DAC)



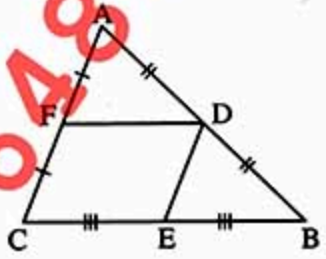
2016 Exam (6) Question (4) (b)

14 **In the opposite figure :**

ABC is a triangle in which D , E and F are the midpoints of $\overline{AB}$, $\overline{BC}$ and $\overline{CA}$ respectively.

BC = 12 cm. , and AC = 10 cm.

Find : the perimeter of the quadrilateral DECF



2018 Exam (14) Question (5) (a)

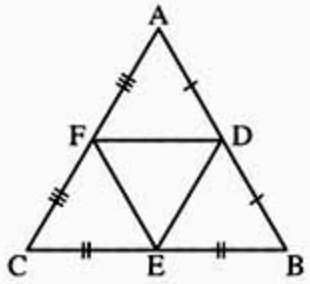
15 **In the opposite figure :**

AB = 10 cm. , BC = 16 cm. , and AC = 14 cm. ,

D , E and F are the midpoints of $\overline{AB}$, $\overline{BC}$, and $\overline{AC}$ respectively.

Prove that :

The perimeter of Δ DEF = 20 cm.

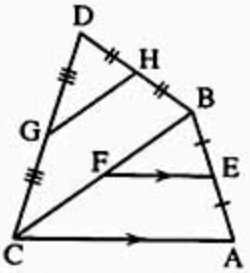


2018 Exam (1) Question (3) (b)

16 **In the opposite figure :**

AC = BC in the triangle ABC , E is the midpoint of $\overline{AB}$, $\overline{EF} // \overline{AC}$, H and G are the midpoints of $\overline{BD}$, $\overline{CD}$ respectively

Prove that : EF = GH = BF

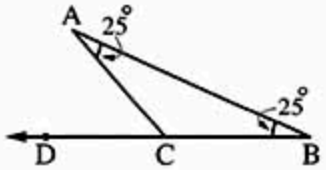


2016 Exam (1) Question (5) (b)

17 **In the opposite figure :**

m (∠ A) = m (∠ B) = 25°

Find : m (∠ ACD)

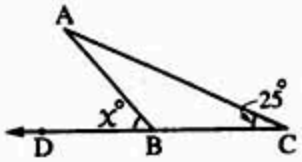


Model 2018 Exam (1) Question (3) (a)

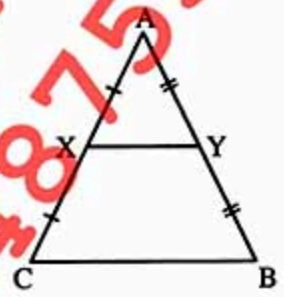
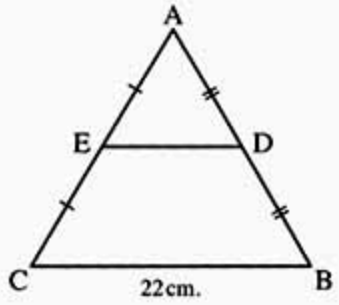
Homework

[A] : Choose The Correct Answer : -

1	The number of axis of symmetry of a square equal ..... (a) 0 (b) 1 (c) 2 (d) 4	
2	The parallelogram whose diagonals are perpendicular to each other and not equal in length is called ..... (a) a square (b) a rectangle (c) a rhombus (d) a trapezium	
3	The rectangle of perpendicular diagonals is ..... (a) a parallelogram. (b) a square. (c) a rhombus. (d) a trapezium.	
4	The hexagon has ..... sides. (a) 5 (b) 6 (c) 7 (d) 8	
5	The edge length of a cube whose total area is 600 cm^2. is ..... cm. (a) 10 (b) 100 (c) 300 (d) 90	
6	The measure of the right angle = ... ° (a) 180 (b) 90 (c) 120 (d) 0	
7	In Δ ABC , if D and E are the midpoints of $\overline{AB}$ and $\overline{AC}$ respectively , BC = 8 cm. , then DE = ... cm. (a) 16 (b) 8 (c) 4 (d) 2	
8	The measure of the exterior angle of the equilateral triangle = ... (a) 60° (b) 90° (c) 30° (d) 120°	
9	The diagonal of square divided its vertex angle in two angles of the measure of each of them is ..... (a) 30° (b) 45° (c) 60° (d) 90°	
10	In a parallelogram if the adjacent sides are equal in the length , then the shape is ..... (a) square. (b) rhombus. (c) rectangle. (d) trapezium.	
11	If ABCD is a parallelogram , then m ($\angle$ A) = m ($\angle$ .....) (a) B (b) C (c) D (d) nothing	
12	The diagonal of the square makes an angle of measure ..... with any of its sides. (a) 60° (b) 45° (c) 120° (d) 90°	
13	The sum of the measures of the accumulative angles at a point = ... (a) 90° (b) 180° (c) 270° (d) 360°	
14	The angle whose measure 90° is ..... angle. (a) acute (b) right (c) obtuse (d) straight	

15	If X and Y are the midpoints of $\overline{AB}$ and $\overline{AC}$ in Δ ABC and XY = 3 cm. , then BC = ... cm. (a) 3 (b) 5 (c) 6 (d) 9	
16	Any triangle has at least two ..... interior angles. (a) right (b) obtuse (c) acute (d) reflex	
17	The perimeter of a square with side length 6 cm. = ... cm. (a) 30 (b) 36 (c) 24 (d) 216	
18	In Δ ABC if : m ($\angle$ A) > m ($\angle$ B) + m ($\angle$ C) , then the angle A is ..... (a) acute. (b) right. (c) obtuse. (d) straight.	
19	In Δ ABC if : X , Y are the midpoints of $\overline{AC}$ and $\overline{BC}$ respectively , then $\overline{XY}$ // ..... (a) $\overline{AB}$ (b) $\overline{BC}$ (c) $\overline{AC}$ (d) $\overline{CY}$	
20	✱ The triangle contains two ..... angles at least (a) acute (b) obtuse (c) right (d) reflex	
21	The area of square of side length 3 cm is ..... cm^2. (a) 9 (b) 6 (c) 12 (d) 3	
22	If ABCD is a rhombus , then $\overline{AC} \perp$ ..... (a) $\overline{BD}$ (b) $\overline{AB}$ (c) $\overline{BC}$ (d) $\overline{CD}$	
23	ABCD is a parallelogram in which : m ($\angle$ A) = 60° , then m ($\angle$ B) = ... (a) 30° (b) 45° (c) 60° (d) 120°	
24	How many sides has a regular polygon if the measure of each interior angle of it is 120° ? (a) 5 (b) 6 (c) 7 (d) 8	
25	The sum of the measures of the exterior angles of a polygon of n sides is ..... (a) (n – 2) (b) (n – 2) × 180° (c) 360° (d) $\frac{(n-2)\times 180^\circ}{n}$	
26	The pentagon has ..... sides. (a) 3 (b) 4 (c) 5 (d) 6	
27	The smallest number of the acute angle in any triangle is ..... (a) zero (b) 1 (c) 2 (d) 3	
28	The right-angled triangle has ..... right angle. (a) 1 (b) 2 (c) 0 (d) 3	
29	**In the oppoiste figure :** m ($\angle$ A) = m ($\angle$ C) , x = ...° (a) 50° (b) 130° (c) 25° (d) 180° 	
30	In Δ ABC, if m ($\angle$ C) : m ($\angle$ A) : m ($\angle$ B) = 1 : 2 : 4 , then $\angle$ B is ..... (a) an obtuse (b) an acute (c) a right (d) otherwise	

[B] : Complete the Following : -

1	The ray drawn parallel to one side of triangle and passing through the midpoint of another side .....
2	**In the opposite figure :** $\overline{XY}$ // ..... 
3	Every two vertically opposite angles are ..... in measure.
4	The measure of each interior angle of the regular pentagon = ...
5	If ABCD is a parallelogram in which : m (∠ A) = 120° , then m (∠ B) = ...°
6	The number of axes of symmetry of the rhombus is ..... axes.
7	The ray drawn from the midpoint of a side of a triangle parallel to another side ..... the third side.
8	**In the opposite figure :** If BC = 22 cm. , then ED = ... cm. 
9	If two straight lines intersect , then the measures of each two vertically opposite angles are .....
10	The measure of each interior angle of the regular hexagon is .....°
11	Any triangle has at least two ..... interior angles.
12	ABCD is parallelogram in which m (∠ A) = 100° , then m (∠ D) = ...°

13	The two diagonals of the rhombus are .....
14	The measure of the exterior angle of a triangle is equal to the sum of .....
15	**In the opposite figure :** If ED = 8 cm. , then BC = ... cm. 
16	The two vertically opposite angles are .....
17	The sum of the measures of the angles of the quadrilateral equals .....
18	If ABCD is a parallelogram in which m (∠ A) = 80° , then m (∠ B) = ...
19	The rectangle is a parallelogram in which one of it's angles is .....
20	The measure of the exterior angle of any vertex of the equilateral triangle = ...°
21	The length of the line segment joining the midpoints of two sides of a triangle equals .....
22	The sum of the measures of the accumulative angles at a point is .....°
23	The sum of the measures of the exterior angles of the convex polygon = ...
24	ABCD is a parallelogram in which m (∠ A) = 60° , then m (∠ B) = ...
25	If ABCD is rectangle and if AB = 4 cm. , BD = 5 cm. , then the area of the rectangle = ...
26	The measure of the exterior angle of a triangle is .....
27	The length of the line segment joining the midpoints of two sides of a triangle is equal to ..... the third side.
28	The measure of the right angle = ...°
29	A circle its radius length 10 cm. , then its circumference = ... (Consider $\pi = 3.14$)

[C] : Essay Problems : -

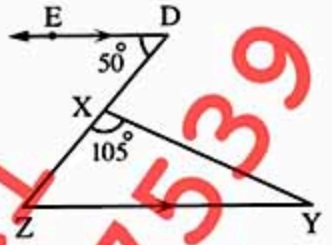
1

In the opposite figure :

$\overrightarrow{DE} // \overline{YZ}$, m ($\angle$ ZDE) = 50°

, m ($\angle$ YXZ) = 105°

Find : m ($\angle$ Z) , m ($\angle$ Y) , m ($\angle$ YXD)



Model 2018 Exam (1) Question (4) (a)

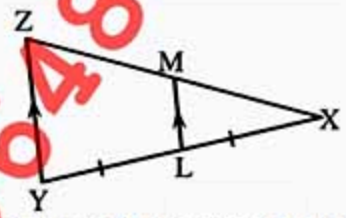
2

In the opposite figure :

L is a midpoint of $\overline{XY}$

, $\overline{LM} // \overline{YZ}$, XZ = 10 cm.

Find : the length of $\overline{XM}$



2018 Exam (7) Question (5) (b)

3

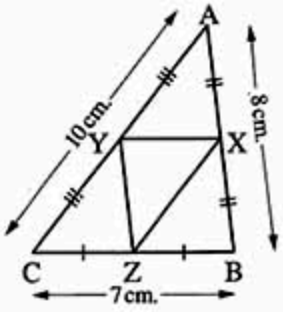
In the opposite figure :

ABC is a triangle in which X , Y and Z are midpoints of $\overline{AB}$, $\overline{AC}$ and $\overline{BC}$ respectively.

AB = 8 cm. , AC = 10 cm.

, BC = 7 cm.

Find by proof : The perimeter of Δ XYZ



2017 Exam (7) Question (4) (a)

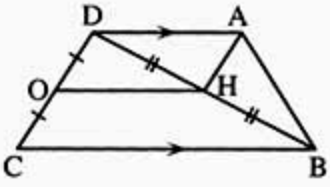
4

In the opposite figure :

$\overline{AD} // \overline{BC}$, $AD = \frac{1}{2} BC$

, H and O are midpoints of $\overline{DB}$ and $\overline{DC}$ respectively

Prove that : AHOD is a parallelogram



2018 Exam (2) Question (4) (a)

5

In the opposite figure :

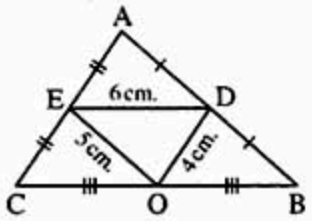
Δ ABC , in which D is the midpoint of $\overline{AB}$,

E is the midpoint of $\overline{AC}$,

O is the midpoint of $\overline{BC}$,

ED = 6 cm. , OD = 4 cm. and EO = 5 cm.

Find : the perimeter of Δ ABC



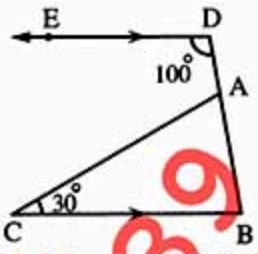
2016 Exam (9) Question (5) (b)

6 **In the opposite figure :**

$\overrightarrow{DE} // \overline{BC}$, m ($\angle$ D) = 100°

, m ($\angle$ C) = 30° and A $\in \overline{DB}$

Find : m ($\angle$ BAC) .

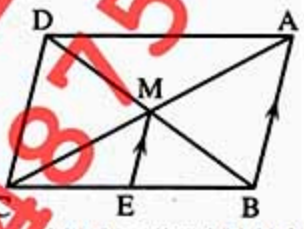


2018 Exam (11) Question (4) (a)

7 **In the opposite figure :**

ABCD is a parallelogram its diagonals are intersect at M

, $\overrightarrow{ME} // \overline{AB}$ prove that BE = EC



2018 Exam (4) Question (3) (b)

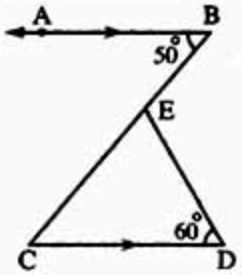
8 **In the opposite figure :**

$\overrightarrow{BA} // \overline{CD}$, m ($\angle$ B) = 50°

and m ($\angle$ D) = 60°

Find with proof :

m ($\angle$ CED)



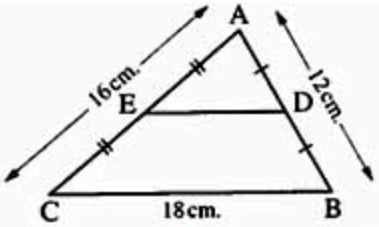
2016 Exam (4) Question (3) (a)

9 **In the opposite figure :**

D and E are midpoints of $\overline{AB}$ and $\overline{AC}$

, AB = 12 cm. , BC = 18 cm. and AC = 16 cm.

Find with proof : the perimeter of figure ECBD



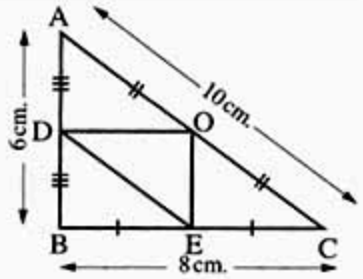
2016 Exam (6) Question (5) (b)

10 **In the opposite figure :**

ABC is a triangle in which D , E , O are midpoints of $\overline{AB}$, $\overline{BC}$, $\overline{AC}$ resectively , $\overline{DE} // \overline{AC}$

AB = 6 cm. , BC = 8 cm. , AC = 10 cm.

Find with prove the perimeter of : Δ EDO



2018 Exam (2) Question (3) (a)

11 **Complete :**

The line segment joining the midpoints of two sides of a triangle is .....

2017 Exam (1) Question (4) (a)

12 **Prove that :** The sum of the measures of the interior angles of a triangle is 180°

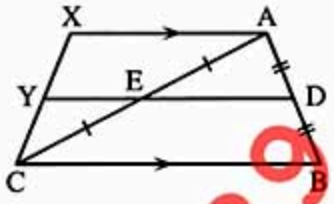
2016 Exam (11) Question (3) (a)

13 **In the opposite figure :**

$AD = DB$, $AE = EC$, $\overline{AX} \parallel \overline{BC}$

, $\overrightarrow{DE} \cap \overline{XC} = \{Y\}$,

prove that : Y is the midpoint of $\overline{XC}$



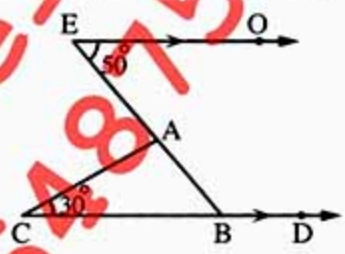
2018 Exam (12) Question (5) (a)

14 **In the opposite figure :**

$\overrightarrow{EO} \parallel \overline{CD}$, $m(\angle E) = 50°$

, $m(\angle C) = 30°$,

Find the measures of angles of ΔABC , $m(\angle ABD)$



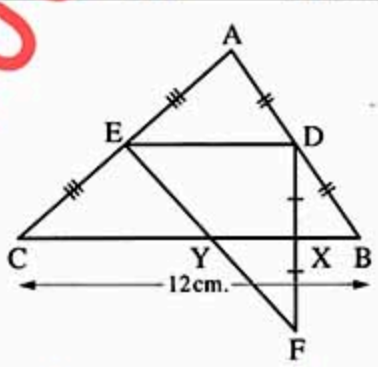
Model 2018 Exam (2) Question (5) (a)

15 **In the opposite figure :**

D is the midpoint of $\overline{AB}$, E is the midpoint of $\overline{AC}$

, $\overline{DF} \cap \overline{BC} = \{X\}$, DX = XF and BC = 12 cm.

Find : the length of $\overline{XY}$



2018 Exam (13) Question (4) (a)

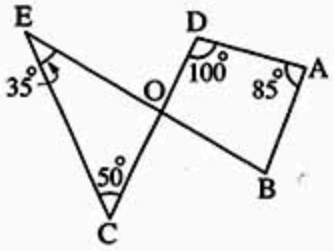
16 **In the opposite figure :**

$m(\angle A) = 85°$, $m(\angle D) = 100°$

, $m(\angle C) = 50°$, $m(\angle E) = 35°$

Find with proof each of :

(1) $m(\angle DOB)$ (2) $m(\angle B)$



2017 Exam (2) Question (4) (a)

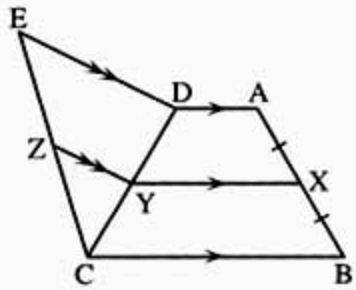
17 **In the opposite figure :**

X is the midpoint of $\overline{AB}$

, $Y \in \overline{CD}$, $Z \in \overline{CE}$

, $\overline{AD} \parallel \overline{XY} \parallel \overline{BC}$, $\overline{YZ} \parallel \overline{DE}$

Is CZ = ZE ? giving reason



Model 2018 Exam (2) Question (5) (b)